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# MAXIMUM DRIVE

Issue No. 5 September/October 2015



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The Big Red Camaro is legendary for its land speed and drag racing wins. *Photo by Guy Spangenberg*

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# The Fastest Cars in the World



It's Good to go Fast, but it's Better to go Faster Than the Last Guy

■ BY JEFF ZURSCHMEIDE

If there's one thread that runs through the entire history of the automobile from 1900 to the present day, it's the search for speed. Racing has been part of the scene since the first car was built. In those early days, a car couldn't touch a horse or a train for top speed, but that soon changed. Legendary racer Barney Oldfield became the first man to drive a measured mile in less than 60 seconds back in 1907. From that point onward, the world speed record has moved steadily upward, but we're never satisfied; we never say, "OK, that's fast enough."

*Maximum Drive* is all about the search for high performance. We celebrate the big horsepower numbers, the low ETs, and in this issue, the highest speeds. As usual, we have taken a close look at a variety of cars, a range of different answers to the question of how to go faster than the last guy.

In this issue, you'll find everything from a vintage hot rod setting records on the dry lakes with original equipment to an ultramodern streamliner with two big Hemi engines aiming at the 500-mph mark. We took a look at the enduring phenomenon of belly tank speed racers, and of course, we have some modern muscle that switches effortlessly between the quarter-mile, the road course and the salt flats.

In addition, we've got information on the state of the market for classic muscle cars, the upcoming new muscle GT350 from Ford and the drag racing and tech content that you've come to expect from *Maximum Drive*. We're proud to bring you the very best in muscle car technology, beautiful custom cars and automotive technical background with every issue.





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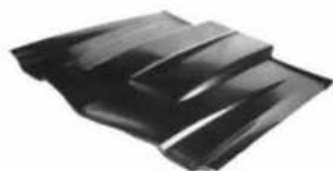


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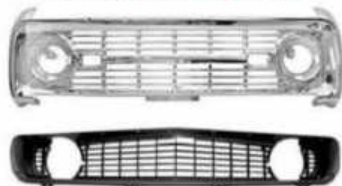
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# AMXceptional

**AMC's Mid-Engine Muscle Car had a Faultless Pedigree, but Missed the Party**

■ **PAUL DUCHENE**

**American Motors (AMC)** was a late and unlikely entrant in the '60s muscle car wars. Known for what it called "sensible spectaculars," the company's 1966 lineup included the bizarre Marlin fastback and concluded with a loss of \$12,648,170. AMC lost \$75.8 million in 1967, and then the Javelin broke the run of bad luck, selling 56,462 units in 1968 and putting the company \$11.8 million in the black.

The Javelin's origins went back to the two-seater Vignale AMX concept (American Motors eXperimental), which featured a ramble seat wherein the back window swung up and the trunk lid became the seat back. That feature was "Nader-ized," but the AMX sold 19,134 copies between from 1968-70, before being devalued into a Javelin package.

However, an exciting mid-engined AMX successor was planned in 1968, and six cars were reportedly completed, one of which



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surfaced on eBay in February. Requiring restoration, it attracted 93 bidders, but the high bid of \$239,899 did not meet the reserve.

The mid-engined AMX was green-lighted by AMC CEO Gerry Meyers, who commissioned Giorgio Giugiaro to compete with AMC designer Dick Teague's team. Giugiaro's concept arrived sculpted in Styrofoam, but Teague's AMX/2 was painted and with lights, and displayed at the 1969 Chicago Auto Show. Teague's engineering group was led by Joe Bishop, working with Giotto Bizzarrini in Italy, and consulting with BMW in Germany. Meanwhile, Teague had already produced the AMX/3 concept, which had a flatter nose, smoother rear deck and larger side windows.

By 1970, the plan was to have Karmann in Osnabruck build 1,000 cars, to be called the AMX/K, but the team couldn't get down to the budgeted \$10,000 price. Furthermore, impending 5-mph bumper regulations couldn't be applied to the design. The project was scaled down to 30 cars by Karmann, but only five were reportedly completed. A sixth was assembled from spares in 1981 and discovered by Teague only 10 miles from Turin, according to contemporary accounts.

The eBay car was offered by its first owner, who declared that only four cars were built. This is the fourth, with significant upgrades from the first three, which were extensively tested at

■ The AMX/3 was built to compete with the likes of the Ford GT40 or DeTomaso Pantera, but sadly never got off the ground.

Monza. The car on offer appeared to be the original AMX/3 design. The AMX/K that was shown at the Turin Auto Show had a cleaner nose treatment and flying buttress C-pillars. The eBay car was returned to the U.S. and driven 1,000 miles before being stored. It was offered complete but disassembled, stripped to bare metal and with complete documentation.

The eBay car was identified as VIN #3634, and the seller reported that the third car, VIN #3632, had been sold for "more than \$750,000" and misidentified as this car. No wonder he was disappointed by the high bid.

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## Sleeve Installer

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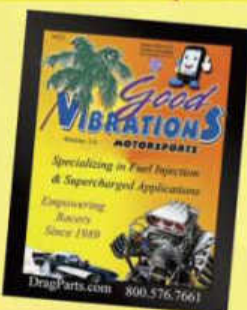
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# ULTIMATE **LAND** **SPEED** VEHICLE

Target 550 is Aiming to Beat  
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BY DAN BURRILL ■ PHOTOS BY FREUD, KORY BLIGH  
AND SWANSON STUDIO FOR TRIUMPH OF AMERICA



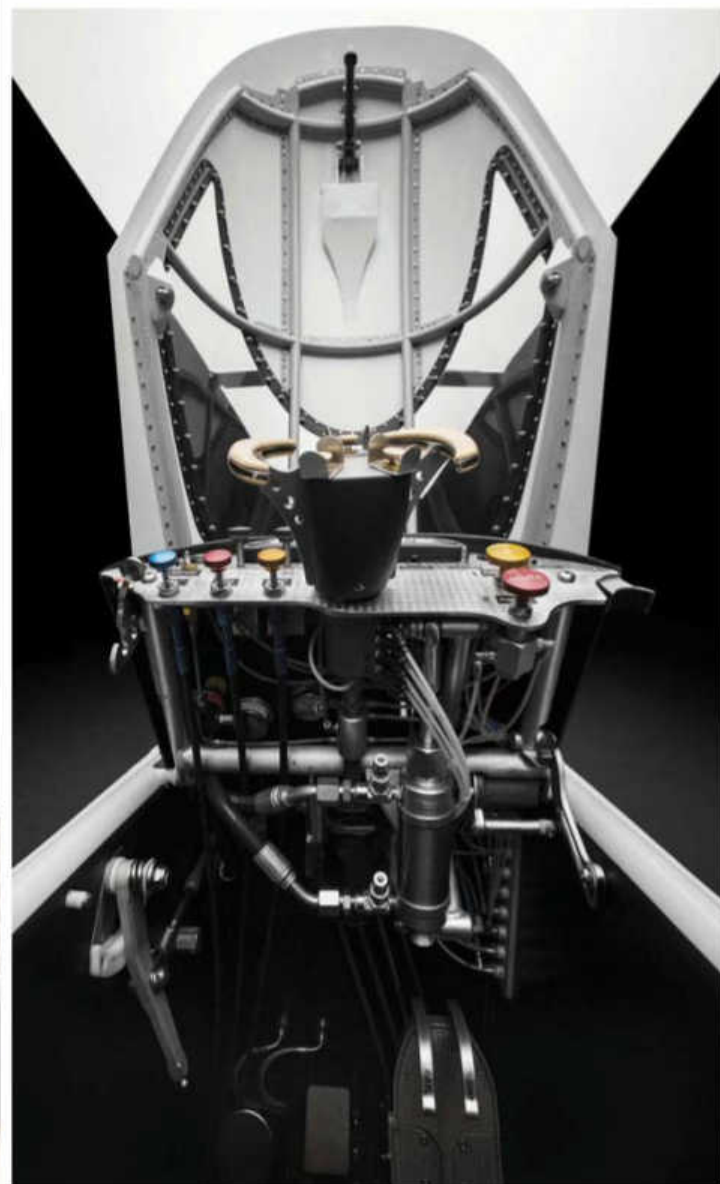


■ The dash tilts up to allow the driver easier access to the cockpit. Orville and Wilbur are the shut-off buttons for the two engines.



**Marlo Treit** has a fascination with speed. He also has a fascination with salt. Not the kind you eat, but the kind you race on. He has been involved with land speed racing for five decades. Before we get to the car, you should know that Marlo was inducted into the Dry Lakes Hall of Fame in September 2000, aligned with some of the greats of our time. In 2000, he was also inducted into the CARS elite group of contributors for the Portland Roadster Show in Portland, Oregon.

In his earlier years, he held motorcycle records, and since then has been involved with many record-breaking vehicles: streamliners, lakesters and roadsters to name a few. He is a man of many





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interests and talents, and all of them seem to involve speed. For example, a personal collection of some of his fast things includes a 1,700-mph Soviet MiG 21 aircraft and a Cessna 414 pressurized twin-engine personal transportation aircraft, and he maintains a salt flats lakester that holds current records.

He had the first lakester to ever exceed 312 mph in the quarter-mile at Bonneville and the first open-wheel car to exceed 333 mph in the mile. Innovation, rather than imitation, is the rule for this man. He has walked where no one has been and will continue to succeed using talents that have been honed by time. Visiting with him really is a trip through time and into the 21st century thanks to his many interesting and often amusing historical antidotes. Currently he is well into his latest obsession, Target 550. This vehicle may be the most exciting new car to invade the world of salt in the last several years.

“Starting with a clean sheet of paper, chalk on the floor and a reasonably open mind, we think we have constructed a vehicle that will exceed the speed that all conventional wheel-driven, piston-powered autos have attained to date by at least 100 miles per hour,” Marlo said.

That might seem to be a bold statement, but with Marlo’s history, the equipment available, a great crew willing to assist and current information received from the experts, it’s likely entirely valid.

Cashing in on his many years of experience, Marlo was quick to point out that money alone will not bring the program to the desired resolution. He went on to note that speed is the end result of good design, low coefficient of drag, proper power supplies, thousands of hours of construction, attention to detail and the ability to stay focused on the initial plan.

“This project was my vision, but after looking at the scope of it, I knew that I would need the



STARTING WITH A CLEAN SHEET OF PAPER, **CHALK ON THE FLOOR AND A REASONABLY OPEN MIND, WE THINK WE HAVE CONSTRUCTED A VEHICLE THAT WILL EXCEED THE SPEED** THAT ALL CONVENTIONAL WHEEL-DRIVEN, PISTON-POWERED AUTOS HAVE ATTAINED TO DATE, BY AT LEAST 100 MILES PER HOUR.



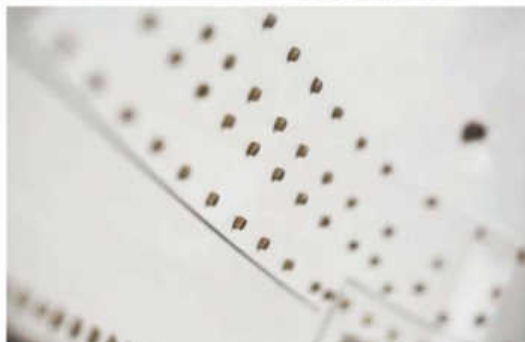




assistance of others,” Marlo said. “I am now the coordinator, and for the most part, that’s the part I play in the whole scheme. This is where unsung heroes begin to add value to the program. Without able assistance from others, this is a project I would not be able to complete in my lifetime.”

Initially there has to be a person or persons who have vision. Without that, there is nothing. In projects such as Target 550, the vision is a minute part of the whole experience. In the vision one must assess the amount of compromise allowable, if any, in every aspect of the build. Driver safety, dependability of the engines, drive units, transmissions, tires, and last but not least, fire suppression and the redundant methods to arrest vehicle speed. These

■ **Tires for a vehicle like this are rare and expensive. Everything on this vehicle is hand fabricated, including the hand brake with the ivory handle.**



areas are where zero is the allowable compromise.

With that premise, the project commenced. When areas failed the sniff test, alternatives were immediately sought out. Many sources have been tapped to maintain the level of construction and design seen in the build diary.

The car has a frontal area of 8.61 sq-ft and is 40-plus feet long with a 1.5-degree included angle on the sides of the body, front to rear. The model was tested and modified in the Western Washington University wind tunnel under the watchful eye of Dr. Seal, and the results were very satisfactory. Wind tunnel work has been a real learning curve. At this time, the front end has been reworked a number of times and the current front end tunnel adds 1,000 pounds of downforce when the front end is raised 4 inches in the air (which could happen if the car runs over a bump). The splitter that Jim Hume designed for the nose killed all lift and protruded around the nose by only  $\frac{3}{8}$  inch. “The staff thought that it should come back a little further on the sides, so we have installed the longer one for this coming test session,” Marlo told us.

He went on to say that outside of his shop he can account for 60,000 hours of work. In his shop he built the transmission, the differentials, all of the drive systems, the blower systems and the engines. Jim Hume did the tube work, sheet metal and latches.

“His [Jim’s] talents for chassis and body construction are without equal. Our conversation regarding this



project was simple. Since I had been gathering parts for some time and he had done massive reconstruction on my lakester, he said, 'I hear you want to build a new car.' I said, 'Yes.' His next question was, 'Have you commissioned anyone to do it?' I replied, 'No.' Jim then said, 'What will it be?' My response was, "The fastest wheel-driven car in the world."

"Jim's response, 'I would be interested. Is there a budget or a time limit?' I said, 'No, we will know when it is done. How long it took and what it costs isn't anyone's business.' From there on we made real progress," Marlo said.

Work on the car started in 1998, and Marlo envisioned it would be a five-year project. Jim thought he was a little off on the projected timeframe. Twelve and a half years later, the car rolled out of the shop—it was 2012.

Marlo is a Ford guy, so this car originally was painted Ford Truck Blue and was on display at the Los Angeles Grand National Roadster Show in 2014. By chance, he received a visit from a guy who was hooked up with Triumph Motorcycles; Triumph of America sponsors a land speed, multi-engine streamliner. Marlo happened to know the builder, and he brought out the guy responsible for the Triumph program.

The Triumph executive looked at the car and noted that the company has had a disastrous test program. They had gone just 80 mph and almost burned their project to the ground.

"So I said to him, 'You guys are going backwards at 80 miles

an hour with a \$1,000,000 piece of equipment,'" Marlo recounted. "In 1959 I ran 174 mph with a Triumph two-engine that I built in my garage over a period of six weeks. That's when this guy's eyes bugged out. He wanted to know where it was."

Marlo explained that when he went into the service, he sold all of his stuff, so it was gone, but he did have some photos, which he showed the Triumph representative.

The rep asked, "Would you let us build a tribute? And if we do that and rewrap your car using the Triumph logos, and you take it to the Grand National Roadster Show, I will work on getting funding for you." Afterwards, Marlo remarked, "What can I say, other than, okay?"

Canby Graphics, working with Triumph of America, put the package together and with only one week to go before the show opened, they got the job done and it looked great.

An interesting perspective on steering and brakes for cars of this type is to note that if you were going 100-mph down the highway, and you want to change lanes, how much do you steer the car? Do you actually move the steering wheel, or do you just "think" it? You basically just take the slack out of the linkage and you have changed the lane. Next, pull the emergency brake on just enough so that you can feel it, and between here and 10 miles up the freeway, you might get stopped before the rear brakes are on fire.

■ The body panels are hooked on like a safe door. They are latched, ribbed and riveted, and they're designed to handle high speed.





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■ All body panels are designed to come off completely or tilt out of the way, or both.

These land speed cars have no front brakes; they have rear brakes only. The only reason for the existence of these brakes is to stop the vehicle if you're rolling in around the shop or moving it by hand.

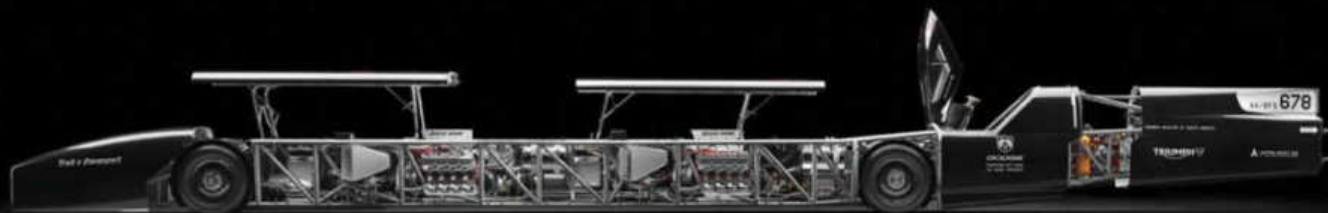
"It's got the best brakes that money can buy from Wilwood, the rotors are good for 7,000-rpm, and I would say the pads are good for about three seconds," Marlo said.

That's why the parachute systems on streamliners are mandatory. This car has four chutes, it has small brakes, and

it has a set of speed brakes to help slow it down. "Keep in mind that the car weighs 8,000 pounds and it's 43 feet long," Marlo told us. "We intend to go 500 miles per hour with the car."

The differentials started out as Halibrands used for Champ cars, and they are the last aluminum castings that Halibrand made while it was still in business. They were purchased for this car in 1992. Arrow Gears made the gears. The car has a 6-inch pinion and a 9-inch ring gear, so it has a 1.5:1 ring-and-pinion ratio. With the quickchange, it's possible to get the ratio down to .75 or up to 3:1.

The car was tested at Woodburn Drag Strip in 2012, at Woodburn, Oregon. A set of stump gears was installed to make sure the tachometers and the other instruments worked, and the car went from 0-100 mph in 500 feet. Keep in mind, this vehicle weighs 8,000 pounds; it's not a drag racer. The twin engines are 500-ci, late-model KB Hemis with Whipple superchargers.





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"The second run that we had last year [2014], we had the most catastrophic failure that I could ever imagine," Marlo remembered.

The Whipple superchargers have billet rotors. They are a screw blower, rather than an air beater blower like a Roots, so they are actually a real compressor. The rotors are billet magnesium. On drag race cars, the blower sits on top of the engine. For this application, the blowers are down in front of the engines to keep the height down so the driver can see. The front-engine blower somehow picked up a harmonic vibration.

When Whipples were made, they were made in Sweden, and the shafts that go into the rotors were pressed in from both ends. They are not one continuous

shaft all the way though. They use a friction mechanism to time the rotors. For whatever reason, the blowers came out of time and they scrubbed each other, so there was a lot of powdered magnesium in the intake system. The magnesium went through the intake system and into the combustion chamber, where it ignited and then went out the exhaust. There was no problem with that except that these engines have a lot of overlap at the top of the exhaust cycle, and the magnesium was still on fire in the combustion chamber as the piston tracked back up through the intake stroke.

AT THIS POINT WE DIDN'T HAVE ANY SUPERCHARGERS BECAUSE THEY WERE BEING REBUILT, SO WE PUT SOME PORT INJECTORS ON THE ENGINES, AND WE HAD NO WAY TO GET GOOD AIR TO THE ENGINES, BUT **THE CAR WILL STILL RUN AT 300 MPH AT 500 HORSEPOWER RUNNING ALCOHOL.**

The engine sneezed and blew a gasket out of the intake side. It happened so quickly the crew didn't pick it up.

After the run, the crew checked the car and everything looked fine. Everything turned over well, so they went out and made another run. This time the sneeze was more noticeable, because the rotors were getting further out of time. The engine compartment from the water tank forward was filled with magnesium dust, and when it sneezed the next time, it blew off several body panels. These body panels are hooked on like the door of a safe, latched, ribbed and riveted. It takes a huge explosion to dislodge a panel. The force of the explosion ballooned the nose by 2 inches.

Les Davenport has been driving for Marlo since 1988. Les took on the task after Marlo destroyed his streamliner in spectacular fashion, and Marlo decided that if he were going to have another car, maybe he should also have a driver. Marlo built this car around Les, as a result.

Today, the car runs well. The crew went back in September of last year. "At this point we didn't have any superchargers because they were being rebuilt, so we put some port injectors on the

engines, and we had no way to get good air to the engines, but the car will still run at 300 mph at 500 horsepower running alcohol," Marlo said.

With the superchargers, the engines develop 1,800 ft-lbs of torque each at 6,800 rpm. The ratio on the blower is 30% over and yields 33 pounds of boost. Five hundred miles per hour is within reach, and Target 550—well, that's within sight, too.

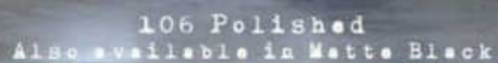
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# E OF SPEED

■ Fritz has a real talent for making anything sitting on or moving on a dry lake bed exciting. This “Hammerin’ It Out” print is special to the artist because it was done in the early-’90s and was the very first piece of art he made into lithographs.

The Work of Hot Rod  
Artist Tom Fritz

BY JAMES MAXWELL



■ Running on the lakes at night was a risky thing in the early days because there was absolutely no organization and no set lines. Tom named this painting “A Word to the Wise” because it is set moments before the driver fires up the engine of the ’32 and takes off into the night at full throttle.

**It all started** when his mom brought home a paint-by-number kit. Young Tom Fritz was instantly hooked on painting and the wonderful smells of the oil-based paints. Prior to that he was pretty handy with crayons, pencils and ink markers of all types. “Since as early as I can remember, I drew on everything, everywhere,” Fritz recalls. “It was so fascinating to me. It was like TV, except I was in control. And people would respond. I drew on the underside of chairs and tables, on my PF Flyers shoes, on two-by-fours in the garage, on my drawing blotter, on the wall in the closet, on the inside lids of game boxes and in newspapers. Once I discovered this cool thing I could do, I couldn’t put it down.”

The love affair with cars started at an early age as well for the kid who grew up in the San Fernando Valley (Southern California). “There was so much



■ 256B is running at top speed and a roost of dirt shoots off of the tires.





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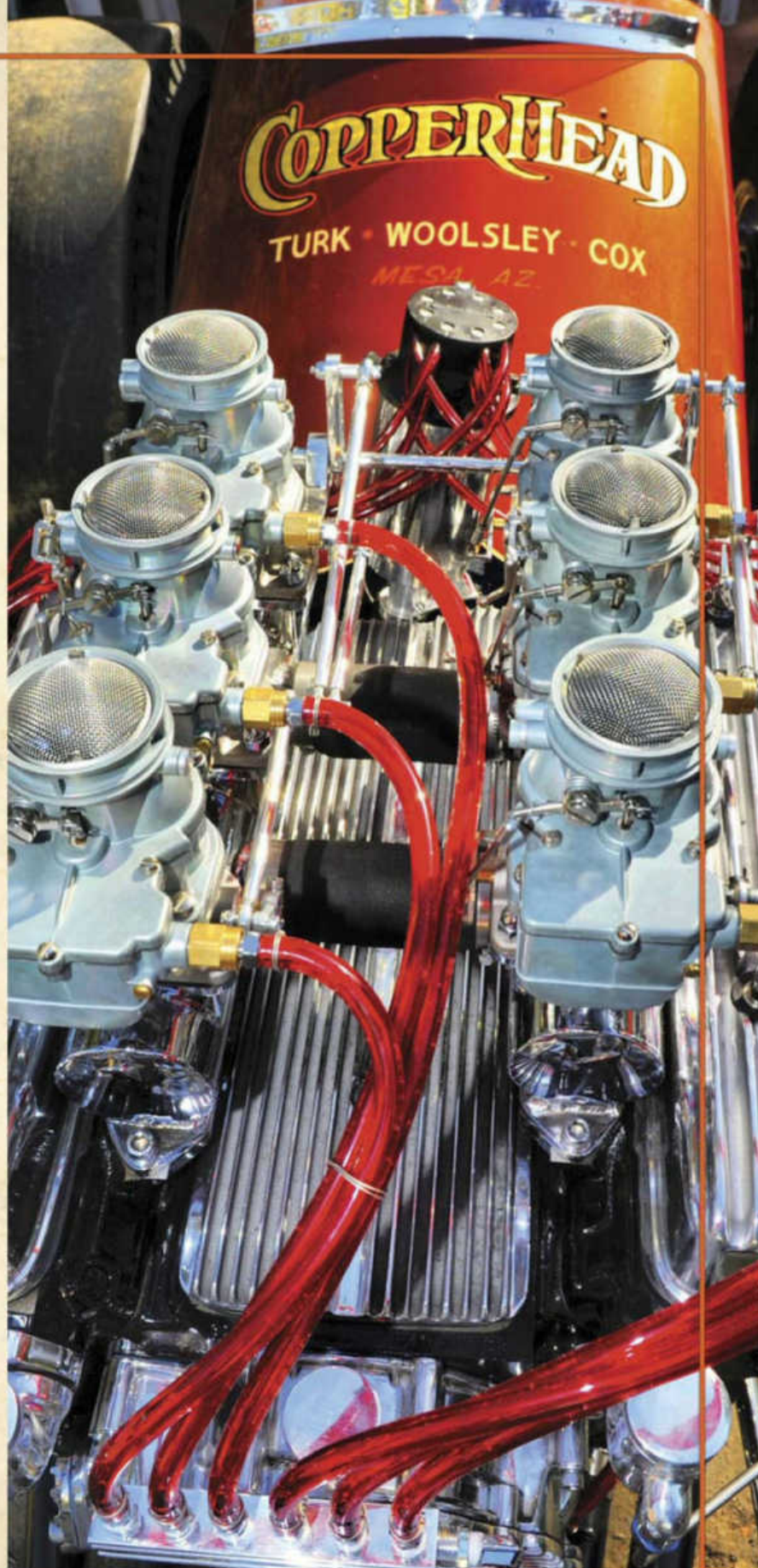
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■ A great deal of time and energy takes place here, sketching out ideas and brainstorming. The walls are filled with photos, drawings and notes.



■ There is a lot of preliminary work prior to the paint hitting the canvas. Pictured is Fritz's sketchbook (one of many) featuring artwork of a classic dry lake bed-type '32 hot rod in its early stages.

I found intriguing about cars: They were big; they were the embodiment of raw adventure,” says Fritz. “You climbed up into them and always wound up going to all sorts of strange, new places with your folks. You were encapsulated in an environment like no other in your sphere. It had its own unique motions, design elements, textures and sounds. You always ate ‘fun’ food in a car. The windshield wipers were hypnotizing. The glove box was a treasure chest full of the interesting and unusual. There was always coin to mine under the floor mats. You, and you alone, were master of the dome light. The cigarette lighter was like the obelisk in ‘2001: A Space Odyssey’—it held magical power—it could be stone cold one moment, and the next moment it could make the end of pop's cigarette burn. And how did pop know when that knob was ready to make fire? I used to stand right next to the garage door when the old Chevy was backing out just so I could sniff the exhaust fumes. I'd hang out

YOU WERE ENCAPSULATED IN AN ENVIRONMENT LIKE NO OTHER IN YOUR SPHERE. IT HAD ITS OWN UNIQUE MOTIONS, DESIGN ELEMENTS, TEXTURES AND SOUNDS.



■ Fritz never grows tired of sitting in front of his easel, making vintage roadsters on the dry lake bed. His style, in this case, is used to draw attention to speed and motion, all the while paying close attention to the contrast between the hard-edged details of the projectile and the soft, organic elements of the lake bed.





■ For this one, Fritz shot his reference photos at noon and positioned the male model in the car, ducked down as would have been standard practice to deal with the rush of wind at speed. Using his fantastic ability of adding his own thoughts on lighting and the effects it produces in an image, he transformed the static '32 roadster into some seriously colorful eye candy.

the window at the gas pump just to smell the ethyl."

Going from being a kid with a paint-by-numbers kit to a world-renowned automotive artist took some time and an education. Fritz earned his Bachelor's degree in Illustration from California State University, Northridge and worked as a commercial artist in the defense industry for more than 25 years before risking it all to become a full-time automotive artist.

One day when he was a young man, he was working on the brakes of an old GMC

pickup truck (which he still owns to this day) in his driveway. An older gentleman from the neighborhood happened to pass by and the two started talking. After shooting the breeze in typical car-guy fashion, Fritz asked the man, who's name was Otis Smith, about hot rodding's early days. Fritz asked about dry lake bed racing from the early, pre-World War II days.

Smith shared that in his earlier years he raced on the dry lake beds of California in a '29 Ford roadster. When Fritz



■ Snapshots presented to Fritz by a neighbor who'd spent his youth racing on the dry lake beds of Southern California form the basis for the various dry lake bed paintings that Fritz has created throughout the years. Fritz received the photographs when he was just starting his career as an automotive artist.

perked up with interest, Smith, who had been a member of the Gophers Car Club back in the day, told him lots of stories and returned later with a shoebox full of original black-and-white photos that he generously gave to his super-interested young neighbor. This treasure box helped Fritz get the sparks flying for his own interest in dry lake bed activities, not to race a car himself, but to create artwork. With the fabulously rare vintage photographs he now possessed, he could create accurately detailed artwork.

When asked about what his greatest lesson was during his formal art education at university, his reply was simple and straightforward, “You needn’t reinvent the wheel. In school, you broaden your understanding and allow yourself to perceive things you haven’t yet thought of or already combined in your own mind, then lock-in and focus and translate your vision outward.



■ Fritz created this setting featuring a typical pair of race cars that used the old P-38 aluminum drop tanks as bodies. The cars, known as belly tankers, were staged in the image, and Fritz chose his own colors and lighting conditions while he worked his magic on the canvas.



■ This early painting by Fritz was an important piece of art for him because it sold almost immediately at the Detroit hot rod show where it was exhibited. The quick sale helped convince Fritz that he was on to something big, and automotive art lovers would support his work. The car is the Scott's Muffler roadster as viewed from the SCTA timing tower back in the day.



■ The quality of light that Fritz applied to this tight shot of the front of a '30 Ford is shown through the front wire wheel as the sunlight shines through the spokes. The engine is fully detailed in this rendition, and the guy standing is a friend who happily volunteered to pose.



■ This '32 Ford roadster (Ray Brown owner) and Indian motorcycle combo came from a color slide that Tom was able to study; however, in coming up with the artwork, he added his own creative twist to the colors. In this particular case, the car is robin's egg blue/green, and it's a nice alternative to the more commonplace black color of the original.

“As far as preparing me for working as a professional artist, I’ll just say it was a springboard, a foot in the door. I left with a portfolio the size of Rhode Island that instantly labeled me as a student fresh out of school. Something else about school, it taught me about maintaining my sanity. It taught me perseverance. Looking back, I would say school caused me to develop an approach, the ability to address a problem and develop visual solutions.”

Today, Fritz still digs the smells of oil-based paint just like when he was a kid. It was a



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■ The number 64D '32 roadster is seen sitting and ready to go, covered in red oxide paint and powered by a single-carbureted flathead V-8.



■ There's something about that first car barreling down the dry lake in the morning with nothing but clean, crystalline air ahead of it, yet in its wake a veil of alkaline dust and uprooted corruption that blurs the distinction between sky and horizon. That's exactly the scene in "First Run."



■ These are the things that spark Fritz's imagination: salt crust on the tires, sunlight flashing on hoods as cars start like bombs detonating, the ear-cracking thunder of eight cylinders, greasy fingers and tinkering, an expression of noise, danger and speed. Oh, did we mention the sunlight?

## I'M STILL WAITING TO GROW UP, STILL LIKE TO DRAW CARS. I WAS DOING THIS STUFF WHEN I WAS A KID ON SCRAPS OF PAPER, AND THEY WOULD CHOKE UP MY DESK DRAWER...

pleasure visiting with him in his studio, and everywhere you look there are cool photos, drawings and notes about cars, motorcycles and trains as well as landscape and background reference images of every description.

"I'm still waiting to grow up, still like to draw cars. I was doing this stuff when I was a kid on scraps of paper, and they would choke up my desk drawer...it just evolved into this. It's who I am, still trying to make a three-dimensional reality out of a two-dimensional surface."

Fritz has a knack for taking a car and creating his own background; oftentimes, at a dry lake bed

■ Using a surplus 315-gallon belly tank from a Lockheed P-38, Alex Xydias' SO-CAL Speed Shop team car ran 198.34 mph from its 296-ci Mercury flathead. Fritz always loved the car, so he had to paint it as seen in all of its glory.

or on the salt, and then he sets the mood for the painting with his own ideas on light sources, quality of light, clouds, composition, perspective and to get the vehicle in its absolute best possible angle, point of view to showcase the lines of the body to the maximum level. He takes some artistic license; however, it's all done with realistic shadows and to lifelike scale. While most of his work never really happened in real life, it all could have!

Education was a topic that kept coming up when talking with Fritz, and his advice to any young kid who really wants to take their car art to its maximum potential is to get educated, educated about art, learning all of the fundamentals, "Learn how to draw, learn about

color theory, learn about how to paint, the chemistry that goes behind it," said Fritz. "Study art history. Artists have spent centuries discovering how art 'works.' Learn about it, that way it gives you a basis for you to start. An art school can guide you."

It's said that his work takes a very uncontrived and unique approach to the wonderful relationship between man, machine and power, all done in beautiful colors and with the soft edges of impressionism. His canvas creations have caught the attention of some impressive clients, including the Ford Motor Company, Harley-Davidson Motor Company,





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■ A '29 Ford Model A roadster sitting on the lake bed, the driver wearing a leather helmet and racing goggles; at this angle, the view is directly into the sunshine, which the artist so expertly depicts through brush strokes.

General Motors, PPG, NHRA, *Hot Rod Magazine*, AAA, Motorsport Aftermarket Group (MAG), Custom Chrome, Inc., Red Bull, Bob Drake Reproductions and numerous other corporations, companies and museums, as well as private commission work. When visiting any U.S. Post Office you're bound to see some more of Fritz's work in the way of a series of iconic muscle cars he painted on special assignment from the USPS. Movie buffs are sure to recognize his style in the posters he's done for the "Deuce of Spades" movie and for "On any Sunday—The Next Chapter." He's been



■ After Jack Chisenhall from Vintage Air built this fabulous '53 Studebaker, the slippery creation hit 219.585 mph on the salt. It had 705 ci of Dart Merlin power with the A/C going, which has to be something the original builders of the car from South Bend, IN never imagined possible.



■ Years ago, Fritz was at an event at the old Palmdale/Los Angeles County Drag Strip and ran into a guy with a very authentic late-'20s Model T roadster. The car really sparked his imagination, so he took pictures of it with the owner seated behind the steering wheel, complete with a leather helmet and military surplus goggles. Later, he shot more pictures of teenaged swimmers from a local school, and then proceeded to create a masterpiece using his own backdrop of a dry lake bed with the car dusty from running at speed earlier in the day.

honored for his work by being selected to do the art for the Amelia Island Concours d'Elegance, plus he's won the top honors for automotive art at the prestigious Pebble Beach Concours d'Elegance annual gathering, held in Carmel, California. He was chosen a record seven times! Fritz Art brushwork can be found in many private, corporate and public collections around the world, and the multi-award-winning artist has a website showcasing his work, Fritzart.com.



■ Art and Lloyd Chrisman's Bonneville coupe was a sensation in the mid-'50s, and the radically chopped '30 Model A coupe remains one of the most legendary and recognizable vehicles ever to run on the salt. Fritz saw the historical machine at an event, and after taking reference photos, he created a wonderful action image of it blasting at speed and kicking up spray off of all four wheels.



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# THE GREATEST GENERATION

Steve Nelson's  
V4/Fuel Lakester is a  
Blast From the Past

■ BY ALAN GALBRAITH







**After spending** high school summers working on his uncle's farm and learning the ins and outs of repairing machinery, Steve Nelson bought his first car, a Ford Model T, at age 16 in 1958. A job at an auto parts store soon followed, and a friendly machinist at the shop taught him the tricks of his trade when Steve wasn't stocking shelves or sweeping floors. A life-long love of all things automotive and hot rods in particular was born.



Throughout the decades, Steve has owned many hot rods and always read about land speed racing at Bonneville in automotive magazines. In 1999, a friend was running a vintage lakester at Muroc dry lake bed and invited Steve along to try it out. One pass and Steve was hooked. The two friends took

the '64 vintage lakester to Bonneville that summer and came within 4 mph of the 231-mph record in the E/Gas lakester class running a destroyed 283 Chevy V-8 displacing 258 ci. The two chased that record for a few years, blowing up engines, learning a ton each time and



# HUGHES

## PERFORMANCE

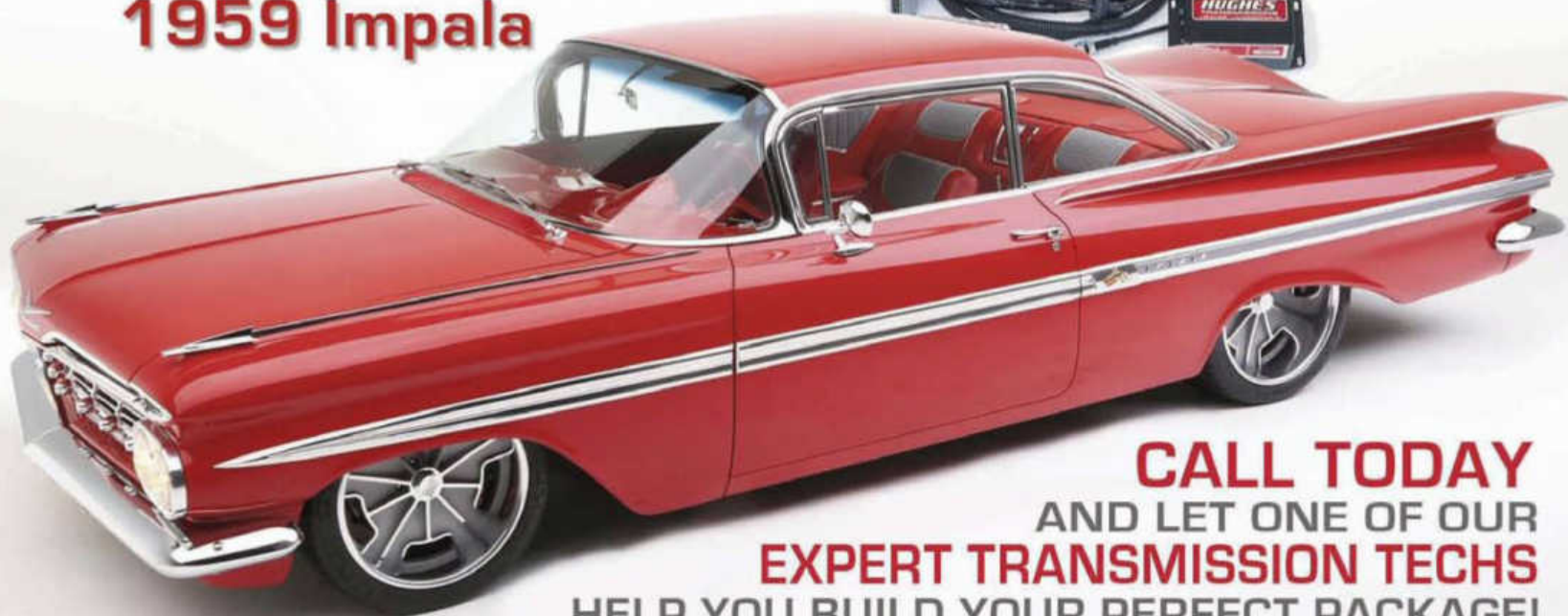
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generally having a ball racing on the salt. After Steve's friend chose to retire the vintage lakester, Steve knew he had to build his own.

It just so happened that Steve's wife knew a coworker with a couple of HU-16 Grumman Albatross 300-gallon wing tanks sitting in his backyard. Family and work had quashed the coworker's dreams of building his own lakester, so he passed them along to Steve, who quickly set to work cutting them open and making a fiberglass copy of the tanks to aid in prototyping his lakester. Throughout the years, Steve had retained an affinity for Model Ts and found a willing cohort for the lakester project in the guise of fellow Model T club member George Olson. A local legend in the San Francisco Bay area, George had built surfboards in Santa Cruz, California in the '60s, designed one of the fastest sailboats on the water, the Olson 30 in the '70s, and was designing roller coaster cars in the early '00s. With George's skills using a CAD design program, he and Steve developed the chassis for the lakester to accommodate a Chevy V-8 engine and Steve's 6-foot 3-inch frame.

The chassis plans finalized, they were turned over to G&B Iron Works in Petaluma, California, where Don German, a long-time Trophy Truck fabricator and racer, using the fiberglass copies, brought them to life. To keep the lakester just barely off the salt, a Model A-style front suspension was mated to cut-down VW torsion rods and capped off with 1946 Ford spindles up front, while a



■ Steve and crew take time out from working on the Lakster to pose for a group photo.

FAMILY AND WORK HAD QUASHED THE COWORKER'S DREAMS OF BUILDING HIS OWN LAKESTER, SO HE PASSED THEM ALONG TO STEVE, WHO QUICKLY SET TO WORK CUTTING THEM OPEN AND MAKING A FIBERGLASS COPY OF THE TANKS TO AID IN PROTOTYPING HIS LAKESTER.







Halibrand V-8 quick change center section mated to 1946 Ford axle housings was hard-mounted to the chassis out back. Goodyear Land Speed Racing tires were wrapped around steel wheels to complete the rolling stock, and Steve brought the project home to fit the body and drivetrain.

The rearend was fitted with a solid spool center section and 28-spline Ford 9-inch axles. While the chassis was originally designed with a Chevy V-8 in mind, Steve's love for older design, four-cylinder engines soon took over. He had heard about a rare DOHC conversion that had been built for a 1932 Ford Model B engine by Robert E. McKinney from Paso Robles, California. Another Model T club member, Phil Andrews, had acquired one of the 20 or so constructed engines to power an unfinished



■ **Surfboard maker turned roller coaster designer George Olson helped design the chassis so that even 6-foot 3-inch tall Steve could get in and out easily.**

drag car project and passed the engine along to Steve for his lakester. The Hemi head design sported nearly 2-inch valves set at 15 degrees to the centerline of the domed 14:1 fly-cut Ross pistons. The two valves per cylinder are actuated by custom-cut billet steel, belt driven, dual overhead cams. On the bottom end, a Kong Jackson 5 main bearing, inset bearing girdle keeps the SCAT crank firmly in place. The revised four-banger inhales a mixture of alcohol and air through a mechanical fuel-

injection system and exhales through a custom-designed header. A dry sump system keeps the engine compact enough to fit in the one-time aircraft fuel tank. A Tex T101 straight cut gear four-speed transmission once used in NASCAR was sourced from eBay to transmit the power to the rearend.

With the lakester ready for racing, Steve set out for the salt in 2008 and ran 160 mph against a 191.417-mph record in the V4/Fuel lakester class. As with any new race car the lakester had teething problems, the motorcycle-sourced ignition system proved not up to the task and oil was sucked into a cylinder, burning a piston. Throughout the following years the lakester's speed slowly crept up in small increments as Steve learned to tune the exotic four-banger and as he



■ Bonneville inspection stickers grace the one-time Gruman Albatross wing tank.

STEVE'S 2011 TRIP TO BONNEVILLE RESULTED IN A 194.75-MPH, TWO-WAY AVERAGE RUN TO ESTABLISH A NEW RECORD IN THE V4/FUEL LAKESTER CLASS. **SLIGHT IMPROVEMENTS IN THE OFF-SEASON SAW STEVE AND HIS LAKESTER PUSH THAT RECORD TO 196.56 MPH IN 2012.**

worked the bugs out of the car.

In 2010, Steve decided to go over the engine and approach its tuning scientifically. The cams were sent to the legendary Dema Elgin at Elgin cams for examination on their Cam Doctor machine. Some cleaning up of the lobe profiles promised better output, so the engine was taken to Pro-Machine in Chico, California for a dyno session. Veterans of land speed racing, the crew at Pro-Machine brought their experience of running a 300-mph '34 Ford roadster to bear on the Model B engine. They discovered that the conventional wisdom of running lots of ignition advance, around 35-36 degrees, for this little Hemi engine was incorrect. Repeated dyno runs yielded 280 hp at 5,500 rpm running only 26 degrees of advance from an engine that in stock form puts out 50 hp.

Armed with a retuned power train, Steve's 2011 trip to Bonneville resulted in a

194.75-mph, two-way average run to establish a new record in the V4/Fuel lakester class. Slight improvements in the off-season saw Steve and his lakester push that record to 196.56 mph in 2012.

Mechanical issues leading up to the 2013 Speedweek and the rain cancellation of the World of Speed and World Finals events left the lakester in the garage for the year, but Steve used the time to good effect. A new twin-disc clutch solved some slippage issues, a new crank fire ignition

system replaced the problematic motorcycle unit and the exposed suspension parts received revised aerodynamic treatments.

All of this work culminated in 2014 when Steve pushed his Model B-powered lakester to a record 201.804-mph, two-way average, earning Steve the coveted red hat of the 200 Mile Per Hour Club (lifetime membership and haberdashery reserved for those who set a record faster than 200 mph).

With that milestone reached, Steve remembered a







Detroit Speed's SEMA Battle of the Builders winning Camaro

Ringbrothers GM "Best Chevrolet In Show" award winner



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■ A 1932 Ford Model B engine with a DOHC Hemi head pushes the lakester to over 200 mph.

conversation he had with legendary engine builder Nick Arias Jr. a few year prior, while in the pits at Bonneville. Nick took a liking to Steve's efforts to set records using an exotic engine design and suggested that he had one that would work perfectly in the lakester should Steve ever want to switch classes. A call to the octogenarian confirmed that Nick recalled the conversation and soon a deal was struck to supply Steve with a Nick Arias Jr. Racing Components Max Duty four-cylinder engine.







While not known for its performance, the venerable GM Iron Duke engine has received quite an upgrade at Nick's hands. The aluminum block is designed with roller cam bearings, beefed-up main bearing caps and can accept the head from a small-block engine from nearly any manufacturer. The 180-ci, 13.5:1 compression mill has the potential to put out 375 hp at 8,500 rpm while burning alcohol, or even more if Steve chooses to switch to nitromethane. If all goes well, those numbers should be sufficient to push the lakester past the existing F/Fuel lakester record of 223.305 mph.

For now the potent new engine sits in a corner of the shop, waiting its final fitting into the chassis. Steve is dedicated to getting it ready for a summer 2015 run at the record. Once he reaches his record-setting goals with this new power plant, he has insinuated he may hang up his helmet. Now in his early 70s, Steve said he'd like to slow down and spend more time with friends. Most notably, the now 90-year-old machinist from Steve's high school auto parts store job likes to stop by the garage for lunch every now and then.



FOR NOW THE POTENT NEW ENGINE SITS IN A CORNER OF THE SHOP, WAITING ITS FINAL FITTING INTO THE CHASSIS. STEVE IS DEDICATED TO GETTING IT READY FOR A SUMMER 2015 RUN AT THE RECORD.





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**February 6-7**  
Good Vibrations  
Southwestern Nationals  
presented by Budweiser  
Southwestern Int'l Raceway

**March 13-14**  
San Antonio Nationals  
San Antonio Raceway

**April 17-18**  
Southern Nationals  
Bradenton Motorsports Park

**April 24-25**  
Palm Beach Nationals  
presented by Sunoco Race Fuels  
Palm Beach Int'l Raceway

**May 29-30**  
Summer Nationals  
Cordova Int'l Raceway

**June 19-20**  
President's Cup Nationals  
Maryland Int'l Raceway

**June 26-28**  
Mopar Nationals  
Grand Bend Motorplex

**July 10-11**  
IHRA Nitro Jam Nationals  
presented by Good Vibrations  
Spokane County Raceway

**July 17-19**  
Mopar Rocky Mountain  
Nationals presented by Good  
Vibrations and Parts Canada  
Castrol Raceway

**August 7-8**  
Northern Nationals  
US 131 Motorsports Park

**September 11-12**  
IHRA Nitro Jam Nationals  
Dragway 42

**October 9-10**  
Summit World Finals  
Memphis Int'l Raceway

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# BIG RED CAMARO

The Original Outlaw Racer

BY LOU LETO ■ PHOTOS BY GUY SPANGENBERG



**Big Red Camaro**, three words that have conjured up emotions for multiple generations of car guys; three words that have set impossible records, and broken them, along with the dreams of owners of more exotic vehicles.

Three words that evoke awe even as the car sits statically, all hunkered down over its broad, muscular fenders, looking ready to move forward aggressively, loudly and quickly; three words that intimidate owners, drivers and crews at any road race or high-speed contest. For nearly three decades, Big Red Camaro has had a high-speed appetite, gobbling up asphalt, salt and silt-like dirt all over North America in a quest to be the fastest.





**IT WAS JUST THE RIGHT SHAPE, LOOKING SO AMERICAN, APPEARING BEST IN RED WITH WHITE STRIPES THAT WOULD STAND OUT IN A SEA OF EXOTICS AND EUROPEAN HIGH ROLLERS THAT ARE AN OUT-OF-REACH COST FOR MOST RACE FANS.**

It all started in 1987, when Dan Gottlieb decided he wanted a vehicle for his son RJ to race. Dan and RJ's quest for top honors was unceasing, but they were equally concerned with safety, which mandated that a full NASCAR-type chassis (built by Bill Osborne), complete with a significant engine setback for better weight transfer, be fabricated underneath and inside a stock-appearing '69 Camaro.

"Given the choice of car, I thought that the '69 Z/28 with hideaway headlights was the ultimate muscle car. That muscular one-year body style is recognizable to so many fans. Who doesn't have a '69 Camaro story they can identify with?" RJ told us. He's right, of course, as evidenced by the fact that the '69 was selected by consumers during Chevrolet's 100<sup>th</sup> anniversary as their number one favorite Chevy vehicle.

"It was an old car [RJ was born in 1970]. It was just the right shape, looking so American, appearing best in red with white stripes that would stand out in a sea of exotics and European high rollers that are an out-of-reach cost for most race fans," RJ said. "We went out of our way to maintain that stock-appearing body. While the Camaro of this era is not the

■ In land speed record attire, the stock '69 Z/28 body wears a flush panel for a grille, with aero extensions at the rear.



best platform to do what we wanted to do, our philosophy was to maintain the basic element of classic American muscle: use a big bore [540 ci] big-block, clearly overpowered V-8 engine," RJ admitted. Another key element to their philosophy is that they've done it all without sponsorship.

Big Red annihilated the record for the La Carrera Classica while achieving overall

victory, and race organizers gained a new three-word description for the 19-year-old driver: world's fastest teenager.

Coming back in 1989, and defined by the La Carerra organizers as “the outlaw racer,” the Camaro was bold and powerful, but did not finish. In a new adventure that same year, RJ piloted Big Red Camaro through 94 miles of closed-off Nevada roads and mountain passes to average 197.99 mph, reaching an incredible 222-mph top speed. Then, after nine full years of dominating speed events, RJ retired Big Red Camaro in 1996, focusing on earning an MBA, trading the handling of the banking on canyon roads and race tracks for a career in investment banking, and later, establishing a family.

### Going Racing Again

Eight years passed, while the Big Red Camaro sat idly on display, away from its Southern California home base, as an attraction in Laughlin, Nevada, until the lure of the red mist sparked a full restoration and jumpstarted thoughts of going hunting for top speed records again. “I was older. I knew that I didn’t want to be a professional racer. Big Red was a logical place to be...for the purity, excitement and to continue to have fun,” RJ remembered. “There was no specific goal.” A year later, now powered by a 598-ci big-block, the Camaro won more top honors in a 1-mile Z2Z event. In the ensuing years, with other versions of 598s, the car garnered many awards, and even “went Hollywood” with an appearance in “Fast and Furious 4.”



**BIG RED CAN ALSO BE REFERRED TO AS A BIG RED CHAMELEON.**  
IT HAD BECOME A MULTI-PURPOSE RACER, ALTERNATING BETWEEN ROAD-RACING  
AND LAND SPEED VENUES.





## The Chameleon Camaro

Big Red can also be referred to as a big red chameleon. It had become a multi-purpose racer, alternating between road-racing and land speed venues. Unique setups are required for each, including engine and transmission changeovers, specific rearend ratios and suspension changes. Wheels and tires are swapped for specific events. The battery, fuel cell and radiator are moved around, and for land speed attempts, the front grille is covered with a Lexan flush panel,



■ A tall hood hides elephant plumbing. Quarter window NACA ducts help pressurize the cockpit to keep El Mirage dirt out during high speeds.

and the wheels use Moon discs. To painstakingly continue to preserve the stock look of a '69 Camaro, artwork is used to illustrate the front grille with hideaway headlights on the Lexan blocker panel, and the Dzus-fastened Moon hubcaps have illustrations of the BBS wheels that Big Red wears for road race events. A changeover from straight-line events to road-racing configuration requires three weeks in team manager Dave Ward's shop, Precision Welding (Hesperia, California); the events calendar is well laid out in advance. Dave's description of the chassis, fitted with QA1 double adjustable coil-overs, includes selecting massive halting power via 12-inch rotors clamped by Wilwood Dynalite brake calipers or 14-inch rotors with Baer brakes. To augment stops after high-speed runs, a DJ Safety parachute system was designed. Since driver safety is paramount, a Diest Safety fire system has been plumbed.

New opportunities that came through the increased popularity of standing mile and standing 1 ½-mile events captured the team's interest. In 2012, the car clocked 234.4 mph at the Mojave Magnum, and the lure of driving on the salt flats at Bonneville became too much to resist. Big Red Camaro got a blower addition and a ProCharger supercharger to significantly up the horsepower. There was no magic formula, and the team had teething problems as it learned and



adapted to the challenges of pushing this brute across 5 miles of low-traction surface.

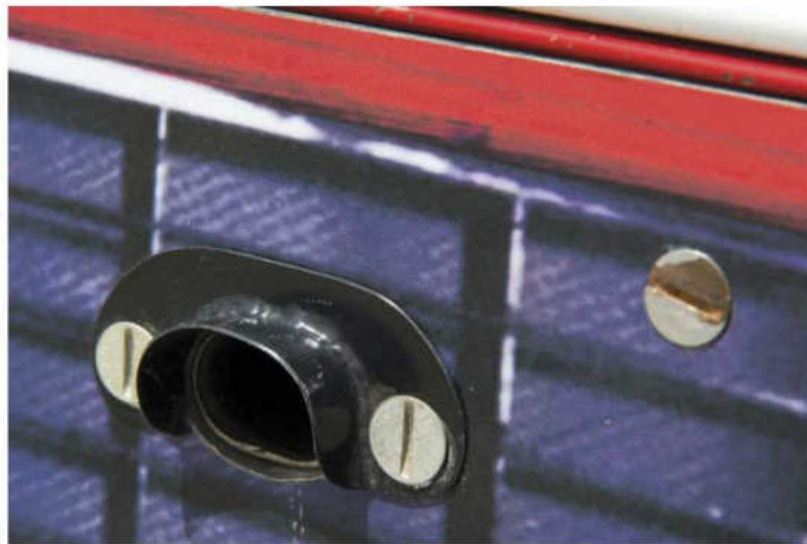
Land speed racing at Bonneville always has its particular challenges. In addition to trying to dial in blower pressures, various types of octane, ignition timing, weight distribution or choosing tire profiles and diameters, local weather is an uncontrollable factor. Wind can blow out a day. Long term winter weather can cause an unacceptable water level on the salt that can literally







■ An extra deep front spoiler helps air management, which is critical for land speed.



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throw a wet blanket on an entire week of sanctioned racing that may have been planned a year in advance, and so it went. Later in the season, an invitation to participate in Mike Cook's Shoot Out at Bonneville provided sorting-out time for the cooling and ignition gremlins that rose up from 5-mile-long land speed attempts. "We tasked the Larry Mollicone-built engines to run wide open at 7,000 rpm with significant high horsepower for long distances," RJ reminded us. Mollicone has built every engine for Big Red since the beginning.

Similar challenges occurred at the other famed land speed racing location, El Mirage. The silt surface denies traction, while creating a fine, powdery, very dirty environment that ensures every internal and external surface is invaded and coated. By three-quarter track during high-speed test runs, RJ was literally blinded by the dirt, "We had to figure out how to pressurize the cockpit," Dave admitted.

Now we arrive at the current year, 2015, and the team is back at Mojave for the Magnum. Equipped with a new MAP sensor, the crew achieved 235- and 238-mph runs. The Camaro is a 46-year-old, stock-bodied car that continues to set the bar, and defeated all comers in the Unlimited Class. It's an unbiased, equal opportunity form of humbling new vehicles with exotic technologies.



■ Ominous-looking exhaust extractors broadcast big horsepower.

### Big Horsepower Choices

Throughout the history of Big Red, the attitude of "there is no substitute for cubic inches" has always been its fans' philosophy. It's a sentiment that's confirmed on the website, Bigredcamaro.com, where the earliest, a 540-ci engine, is referred to as a "Peanut motor" with only 850 hp. The latest three versions, which start at 990 hp and move up all the way up to 1,900, are all identified with the basic architecture of 598 cubes, with purpose-built Brodix cylinder blocks, heads and intake manifold. Unique racing applications are



## FOR NEARLY THREE DECADES, BIG RED CAMARO HAS HAD A HIGH-SPEED APPETITE, GOBBLING UP THE ASPHALT, SALT AND SILT-LIKE DIRT ALL OVER NORTH AMERICA IN A QUEST TO BE THE FASTEST.

considered when assembling for specific forms of speed and/or endurance. Focusing on the latest 598 engine, developed for land speed attempts, the selected components include a crank supplied by Kings Crankshaft, with Diamond pistons tied to Carrillo connecting rods. The camshaft is sourced from Bullet. Keeping the lubrication flowing is a Stock Car Products oil pump; the oil pan is an Olsen unit. Fuel delivery is through a Ron's Fuel Injection mechanical fuel pump. MSD supplies the ignition and distributes the spark to the fuel/air mixture. Exhaust gases are expelled through headers built by Arizona-based REM. Racing fuels are from VP, and all fluids and air are filtered by Moroso. The key high-horsepower element also offers powerful visual impact: a front-mounted ProCharger supercharger, with its huge plumbing, up to the Carb Shop-engineered blow-through carburetor. "In most supercharger

■ The purpose-built, all go, no show Elephant is the largest horsepower engine developed for Big Red yet.

applications, the ProCharger would be belt-driven, but the low-traction surfaces of land speed racing cause a lot of on/off throttle activity; this could snap any belt," Dave explained. "We chose a gear-driven supercharger drive system engineered by Alston Chassis Works. The added benefit is that we can change gears in the drive, allowing the team to vary the boost." Those gear changes can increase boost that allows the team a horsepower range of 1,400-1,900. The trunk-shaped, large-diameter plumbing from the ProCharger to the carb triggered the nickname of this new land speed engine, "the Elephant."

### Loyal, Dedicated Crew

Big Red didn't just happen. It takes a commitment to excellence and results that only comes from the experience







that a long-term, supportive crew can offer. As team manager, Dave is fortunate to have Tim Fleenor as crew chief. Head mechanic Mark Ewing works with his talented team of mechanics: Shawn Umphries, Eddie Cummins and Cliff Whetstone. Lorna Ward is the team's event coordinator, and Larry Mollicone, as we mentioned earlier, has built every engine for Big Red since the beginning.

Whether road racing or blasting down a straight line, monitoring is critical and essential; Racepak diagnostics and tech are handled by Zach Smith. Dan Gottlieb, the man with the plan to get RJ racing way back when, still owns Big Red. RJ has been the sole driver behind the wheel.

### Accuracy, not Folklore

Big Red has earned its reputation more as a Camaro than for driver RJ, and he's comfortable

■ A long-term, dedicated crew ensures Big Red is ready for RJ Gottlieb to belt in the cockpit.

with that. "When I stand near the car, people make the connection from the old photographs of the red-haired teenaged driver with Big Red. If I step away, or am walking around without my driving suit, I am not recognized," RJ said.

As with many legends, history can be distorted. The accurate story of this iconic Camaro will be told through "Big Red, the Original Outlaw Racer," on NBCSN, starting Monday, July 27, 9 p.m. EST. The show will continue to air for eight consecutive Mondays in the same time slot and will re-air on NBCSN on Wednesdays, starting July 29 at 3:30 p.m. EST, 12:30 p.m. Pacific.

Big Red Camaro. Still three big words. Big Red's back. Creating new history. The legend continues. **MD**





# VERSATILE 'VETTE

Rick Hoback's Record-Setting Corvette is a True Dual-Sport Racer

BY DAN BURRILL ■ PHOTOS BY DEE BONNELL, GENE WONG AND BRANDY PHILLIPS











WHILE WE WERE THERE WE GOT TO SEE THE CARS AND WHAT WAS HAPPENING, AND I KNEW THAT THIS WAS SOMETHING I REALLY WANTED TO BE A PART OF.

**Rick Hoback** didn't get into land speed racing until 2011, but he's come a long way fast. It all began when he saw an article in a magazine about a top speed challenge in North Carolina. He had been involved in drag racing since he was in high school and this event really appealed to him.

"My uncle and I drove down from Ohio to North Carolina in April in his 2001 Corvette Z06 to check this out, but it was snowing," Rick said. "As soon as we got there, we realized that this was a really cool event. While we were there we got to see the cars and what was happening, and I knew that this was something I really wanted to be a part of."

Right then and there he decided, "I'm going to buy myself a Corvette. I'm definitely buying one. I just have to find something I can afford. So I called back home and a friend of mine actually



■ Speed is measured from a standing start to the end of a mile-long straight course. Rick Hoback set the record at 202-mph.



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had one for sale on his car lot, and sight unseen I pretty much made the offer.”

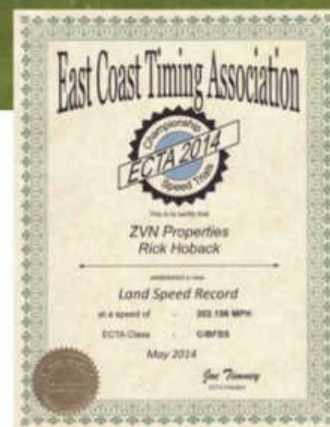
As it turned out, the car had a little bit of damage: Water had leaked into it and there were a few other minor issues, but it was all stuff he knew he could

fix. On the positive side, the price was right, it's a '99 model, and he only paid \$12,500 for it.

As soon as they got home and picked up the car, Rick began the modifications with a six-point harness, a harness bar and other necessary upgrades to make the Corvette go 150 mph at its next event.

After making a few runs where the 'Vette lifted at the end of the track to get through the traps, he

■ The yellow Stroud parachute became a necessity as speed increased.



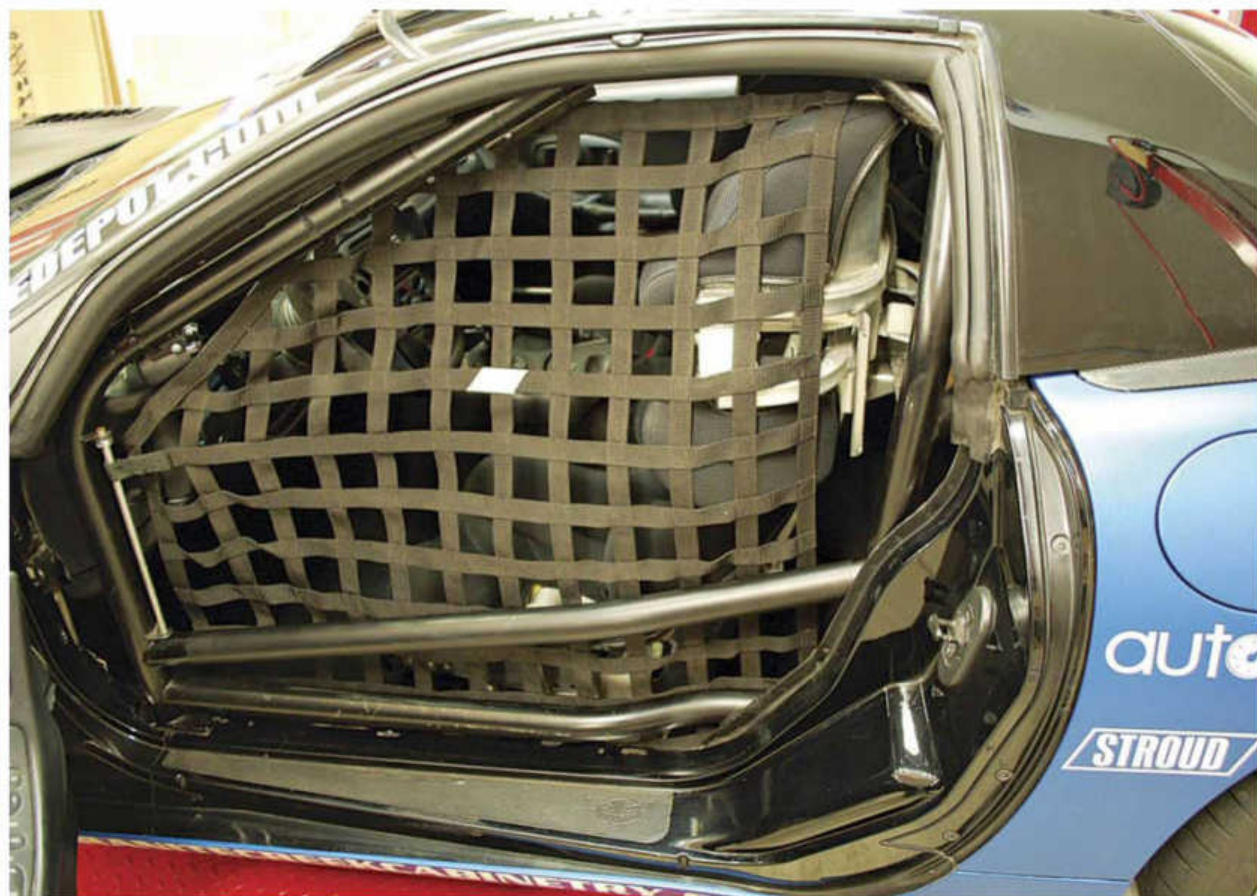




NOW IN HIS FIFTH YEAR OF RACING, THE CAR IS STILL RUNNING STRONG. **"IN ADDITION TO RUNNING THE LAND SPEED RECORD, I PUT IT ON THE ROAD COURSE AND I AUTOCROSS IT," RICK SAID. "AND THE CAR IS RUN IN THE OPTIMA STREET CAR CHALLENGE EVENTS."**

decided to go all out. That's when the real build started. Rick wanted to see how fast he could go on a budget, so he contacted STS to make a rear-mounted 67mm twin-turbo system. The crew at STS was game; they also wanted to see if Rick could go 200 mph with nothing but turbos on a stock engine.

The 'Vette runs a stock LS1 engine; nothing has been touched. By going with the turbos,







■ The secret ingredient is the twin turbo system hidden under the rear of the car.

HE MADE THE DECISION TO KEEP TURNING UP THE BOOST ON EVERY PASS UNTIL THE CAR HIT THE 200-MPH MARK OR IT BLEW THE ENGINE. **FINALLY, HE HIT THE 202 MARK, RUNNING 24 POUNDS OF BOOST.**



Rick figured he could get unlimited power, as much as the engine would hold. He'd just keep turning up the boost until it came apart—and that's what he did.

"We bolted them on in a weekend and started tuning, and to date, the car has 91 dyno pulls on it," Rick said. "We don't use the dyno anymore; we just tune it at the track, and we keep turning up the boost."

Now in his fifth year of racing, the car is still running strong. "In addition to running the land speed record, I put it on the road course and I autocross it," Rick said. "And the car is run in the Optima Street Car Challenge events."

The 'Vette works well in a variety of events, but it really excels in the standing mile land speed events.



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■ Ever see carpet and a full interior in a race car before? This also doubles as Rick's daily driver.

Rick has set six records with the car so far. He currently holds the fastest speed of 202 mph.

For a while he was stuck in the 180-plus mph zone. That's when he made the decision to keep turning up the boost on every pass until the car hit the 200-mph mark or it blew the engine. Finally, he hit the 202 mark, running 24 pounds of boost.

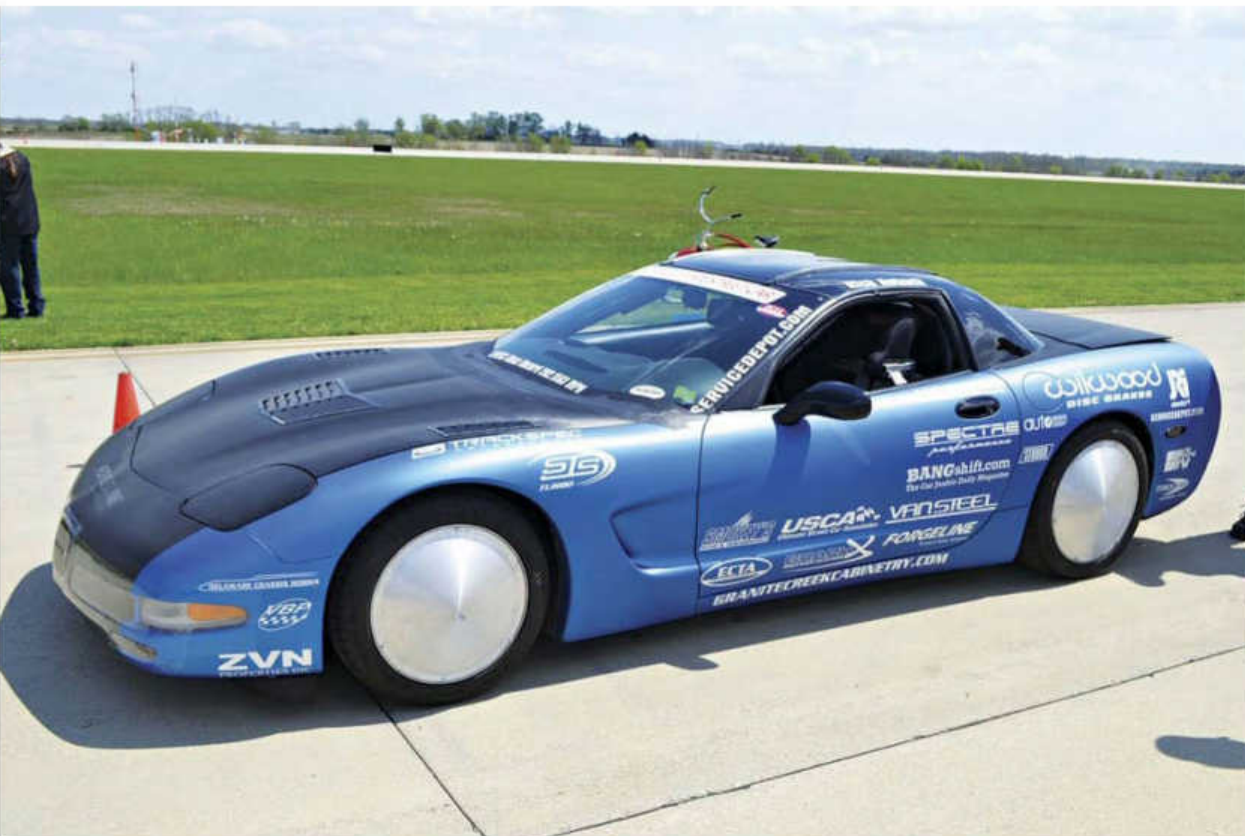
"The scary part of the ride is the wind blowing when you are at speed. You are getting shoved all over the place, but for me, the anticipation of the engine letting go is the worst," Rick told us.

The car produces 850 hp to the wheels, and to push a stock engine time and time again, pass after pass, and then to road course it in between, is asking a lot. To date, though, the engine is still running and in one piece.

Rick runs the land speed event four times a year, and in between, the car is run on a road







**OPTIMA'S SEARCH** for the Ultimate Street Car began with an idea back in 2008. Cam Douglass decided to take SEMA Show cars and put them on the track so everyone could experience the "race car-level" performance that the aftermarket can provide for real street cars. He hooked up with Jimi Day, and the two of them crafted the format and rules of today's OPTIMA Street Car Series.

Event cofounders, Cam and Jimi, walked the massive expanse of the SEMA Show every year, but often left wondering if the incredible machines on display were just nice showpieces or were actually capable of being driven on the street and enjoyed on the track.

They decided to answer that question in 2008, renting out the race track at Spring Mountain Motorsports Ranch in nearby Pahrump, Nevada and inviting cars from the 2008 SEMA Show to come run on the track after the show in the inaugural Optima Ultimate Street Car Invitational (OUSCI). Fewer than 30 cars accepted the invitation that first year, and many were not running by the end of the day. However, the event struck a chord with the automotive aftermarket and word quickly spread through magazines and TV coverage.

The event has grown in size and scope each year and has recently relocated to the Las Vegas Motor Speedway to accommodate additional competitors, which now number close to 100, as well as thousands of spectators. The

event has also spawned its own TV series, "Optima's Search for the Ultimate Street Car," which airs every Friday and Saturday night on MAVTV at 7 p.m. Central.

While vehicles are still selected right off the SEMA Show floor every year for the OUSCI, additional competitors are now invited through a series of qualifying events that take place at tracks all across the country, throughout the year. Cars and trucks competing in these events will go through five different elements to determine which vehicles will be invited to the 2015 OUSCI. Since it is an event for street-driven vehicles, all competing cars and trucks must be street-legal, licensed and registered. They will pass a rigorous tech inspection as well as show car judging in the Lingenfelter Engineering Style & Design Challenge. They must also complete a road rally that takes place on public roads around the track and will involve several checkpoints, typically including an Advance Auto Parts location.

The on-track portion of the competition involves timed laps on the road course in the Falken Tires Road Course Time Trial, timed passes on an autocross course in the Detroit Speed & Engineering Autocross, as well as competition on the Willwood Disc Brakes Speed Stop Challenge, which measures accelerating and braking abilities.

The composite scores from the track events, the road rally and style and design judging will result in winners in each of four classes of vehicles:

**GT**—1990 and newer 3,200-pound minimum weight 2WD

sedans, four-seater coupes and late-model trucks (e.g., Fifth Gen Camaro, BMW M3/M5, Cadillac CTSV).

**GTS (sports car)**—1990 and newer 3,200-pound minimum weight factory production two-seater autos and any all-wheel drive vehicles (e.g., C5/C6/C7 Corvette, Mitsubishi Evo, Nissan GTR).

**GTV (vintage)**—1989 and older 3,200-pound minimum weight rear-wheel drive (e.g., '69 Camaro, '87 Monte Carlo and '74 Pontiac Firebird).

**GTL (lights)**—All vehicles less than 3,200 pounds.

In addition, K&N Filters sponsors a Spirit of the Event invitation at each competition, which awards an invitation to SEMA and the OUSCI to the competitor that best embodies the spirit of the event. Competitors who don't win an event may also receive an invitation by accumulating enough points at qualifying events throughout the season. For that reason, it is not uncommon to see competitors at events who have traveled several hundred or even thousands of miles to compete.

While the stakes are high, the emphasis is on a safe and enjoyable experience for all involved. While some forms of racing limit makes and models, Optima's Search for the Ultimate Street Car offers competitors and fans alike the opportunity to see virtually any year, make and model of production vehicle square off in a head-to-head competition for the right to be called "the ultimate street car."

■ The venerable C5 Corvette has dominated every type of racing where it has been entered. It's a great all-around performance design. The venerable C5 Corvette has dominated every type of racing where it has been entered. It's a great all-around performance design.

course. The East Coast Timing Association sanctions these events on old airport runways. The event is a standing mile where the car starts from a dead stop. On the airport runway in Ohio, where these runs were made, the car starts on a painted surface, so there is no burnout. At the start, the car rolls in first gear, and then when it gets to second, the car is on the concrete and its hard acceleration all the way to the finish. Of course, the surface is not perfect, and it's possible to break traction anytime during the run.

One thing that makes these runs difficult and sometimes tricky is that the wind is constantly blowing. "I've had my steering wheel turned at probably 30 degrees to the left, and the wind is still pushing the car to the right," Rick told us.

To make the car more aerodynamic, Rick used cardboard and duct tape along with an air dam made out of plastic, which is also held in place with duct tape to reshape the frontal area, and the car picked up the additional 6 mph to set the record. In true race car fashion, the wheels are covered with Dean Moon aluminum racing discs.

To go from land speed runs to Optima competition requires a lot of preparation. The suspension setups are different, wheels and tires must be changed, and there are several other necessary alterations, such as brakes and pads, depending on the track and conditions. The car still runs on pump gas; however, on the land speed runs water and alcohol are injected to help with the cooling. **MD**



**GT350:** Few alphanumeric combinations resonate more with gearheads, whether or not they're Ford fans. The GT500 may have been the king of the road, but the GT350 was the working man's hero: a small-town welterweight who made it big.

Ford has shown restraint in its use of the GT350 moniker, invoking it for only a handful of special-edition Mustangs since Shelby's 1965 original. This year, 2015, is to be one of those years, and we think the new GT350 is worthy of the name.

### **A Look Back at the Original**

Ford and Shelby American first unleashed the GT350 in 1965. Ford designed the Mustang to run the gamut from six-cylinder "secretary's car" to full-on racer, but getting SCCA approval for the Mustang required some serious work, so Ford turned to Carroll Shelby. Shelby is a legend now, but back then he was a recently retired

racing driver who was just starting to make a name for himself with his Ford-powered AC Cobras, and he was also being tapped by Ford to sort out the GT40 for LeMans.

The original batch of GT350s started out as factory-built '65 Mustang GT hatchbacks that were shipped to Shelby America in California for modification. There, the cars received a stiffened suspension with Koni adjustable

shocks, extra body bracing, a beefier rear axle with a limited-slip diff and bigger brakes (Kelsey-Hayes discs up front and drums from a full-size Ford station wagon out back). Fifteen-inch mag wheels held Goodyear tires rated for 130 mph. The 289-ci engine received a high-rise intake manifold, re-jetted four-barrel carb with center-pivot floats (to reduce fuel sloshing around under hard acceleration, braking and cornering) and tube headers, all of which raised the output by 35 hp to 306. Shelby's crew finished off the cars with a fiberglass hood and the signature blue racing stripes.





A white Ford Mustang GT350 is shown from a rear three-quarter view, driving on a paved road. The car is in motion, with a slight blur on the wheels. The background is a clear sky with a gradient from blue to white. The title 'THE BEST MUSTANG EVER' is overlaid on the right side of the image in large, bold, black and white text.

# THE BEST MUSTANG EVER

Ford Revives an Icon  
in the new GT350

■ AARON GOLD





## IF YOU'RE A GT350 AFICIONADO, YOU KNOW THE ORIGINAL WAS MORE ABOUT THE CHASSIS THAN THE ENGINE.

Technically, the original GT350 was a homologation special, a run of street-legal cars necessary to get SCCA approval. The real *raison d'être* was the race-ready GT350R, which shared the GT350's chassis mods and added a full-on blueprinted racing engine and a stripped-out interior.

This year marks the 50<sup>th</sup> anniversary of the original GT350, so what better time for a new one? But if you think the new GT350 is just a tarted-up Mustang GT, then man, have we got news for you.

### Voodoo Under the Hood

Star of the new GT350 is the 5.2L V-8 engine, code-named Voodoo. This is the first production engine from Ford to use a flat-plane crankshaft, which offsets the connecting rods at 180-degree intervals rather than the standard 90 degrees. The flat-plane crank allows the firing order to alternate between cylinder banks, reducing exhaust pulse interference and improving high-rpm power. High rpms

are the name of the game: The Voodoo redlines at a nose-bleed-inducing 8,250 rpm, and its peak horsepower is delivered at 7,500 rpm.

How much horsepower? Five hundred and twenty six. Let that number roll around in your brain for a moment: 526 horsepower. That's more horsepower than an original '65 GT350 and a plain ol' 289 Mustang combined (and we're ignoring the fact that '65s were measured in gross horsepower rather than modern-day net hp). We hasten to add that the Voodoo does not use forced induction; it's the most powerful naturally aspirated engine Ford has ever produced. Peak torque is 429 lb-ft at 4,750 rpm, with 90% of the engine's torque available between 3,450 and 7,000 rpm. All of this power is channeled through a six-speed manual transmission to a Torsen limited-slip differential.

### Chassis: More Than Just Stiffened Springs

If you're a GT350 aficionado, you know the original was

■ The original GT350 took Ford's "secretary car" and made it into a racing powerhouse more popular than ever in vintage racing today.

more about the chassis than the engine. The stock Mustang GT is, without question, the best-handling Mustang yet (helped by the adaptation of an independent rear suspension; only took 'em 50 years), but the GT350 strives for more. Along with revised spring rates and a lowered ride height, the GT350 gets a wider front track than the standard Mustang. Widening the track necessitated revised sheet metal, so all of the tin ahead of the A-pillar is unique, with a lower hood line and a carbon-fiber composite grille opening.

One of the most notable upgrades is the inclusion of MagneRide shock absorbers, which are a pretty big deal considering this is a pet technology of archrival General Motors (GM refers to it as Magnetic Ride Control, or MRC) that can be found in the Corvette, Camaro and Cadillac's V-series cars. (Audi uses it for some of its high-end sporting models as well.) MagneRide dampers use a fluid that is impregnated with iron particles. When a magnetic force is applied, the fluid's flow resistance increases. This allows the use of a more compliant shock that can be stiffened nearly instantly. Ford's system monitors the motion of the wheels and can alter the shock stiffness every 10 milliseconds. We've been impressed by this system in other vehicles; it provides all the benefits of a super-stiff shock





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without the super-stiff ride, and we're pleased to see it employed on the new GT350.

As with the original GT350, brakes are also on the upgrade list: six-piston Brembo calipers up front with four-pot calipers out back. Disc diameter is 15.5 inches up front and 15 inches in the rear; the rotors are two-piece, cross-drilled, iron units with aluminum hats. Why no carbon fiber? Ford said it wanted to keep the price down.

You'll find those brakes nestled inside of 19-inch aluminum alloy wheels, 10.5 inches wide up front and an extra ½-inch in the back. Tires are Michelin Pilot Super Sports with a tread pattern unique to the GT350.

### Track Ready: the GT350R

Just like Shelby did back in 1965, Ford will create a special track-ready version of the GT350, and it too will be called GT350R. Changes include significant chassis, suspension and body changes as well as a severe diet.

Upgrades start with the suspension, with unique spring rates, sway bars and bushings and special tuning for the MagneRide dampers. The ride height is slightly lower than the standard GT350, and the front suspension features cross-axis ball joints. Even the alignment settings are unique to the R.

Weight reduction is a key element in the GT350R, so the rear seats, air conditioning,

stereo, trunk floor, tire repair kit, backup camera and even the exhaust resonators have been sacrificed. (Those who want a little more comfort for street driving can order air conditioning, a stereo and navigation as part of an option package.) Carbon-fiber wheels shave 13 pounds of unsprung weight per corner compared to the GT350's aluminum wheels, and they are shod with Michelin Pilot Sport Cup 2 tires with a 350R-specific compound.

Finally, the R gets revised aerodynamics in the form of a revised front splitter and carbon-fiber rear spoiler, both of which work to increase downforce and move the center of pressure towards the back of the car. Red-painted brake calipers, red interior trim and a red edge to the

distinctive racing stripes visually separate the R from the other GT350 models.

### Get 'em While you Can!

Ford will build a very limited run of cars for 2015 before moving to full production in 2016. Official pricing had not been announced as we went to press, but if we had to guess, we'd say the GT350 will list for around \$50,000 while the R will fetch an additional 10 to 15 grand. We can expect dealers to add a hefty price premium to the limited-edition 2015 cars.

It's hard not to get excited about a 500-plus-hp Mustang, but we're intrigued by what we see in the new GT350, not just the big power numbers, but the attention to other equally important details. Having seen what Ford can do with previous-gen Mustangs (much as we love the Shelsebys, the M3-chasing Boss 302 remains one of our favorites), we're looking forward to our chance to run the new GT350 both on the street and on the track.

Most of all, we're pleased that Ford is treating the GT350 moniker with the respect it deserves by building a car in the spirit of the original. Ol' Carroll may be gone, but we think he'd be rather fond of this new GT350.

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**Most late-model** street vehicles use an internal hydraulic clutch release bearing, sometimes called a concentric slave cylinder (CSC). Yet, unfortunately, many of them suffer from clutch engagement high on the pedal travel. For most drivers, this isn't comfortable.

Conveniently, Ram Clutches has introduced a pedal-height adjuster that is situated inline between the hydraulic master cylinder and the slave cylinder. It's, in effect, an accumulator in which a piston and spring are housed.

When the adjustment screw is turned inward to its fullest extent, the piston cannot move and the adjuster is bypassed. In fact, this is

# How to Set Your **CLUTCH PEDAL** Height

**Finally, a Cure for an Uncomfortably High  
Clutch Pedal on Late-Model Street Cars**

**BY SAM LOGAN ■ PHOTOS AND ILLUSTRATIONS BY MOORE GOOD INK**



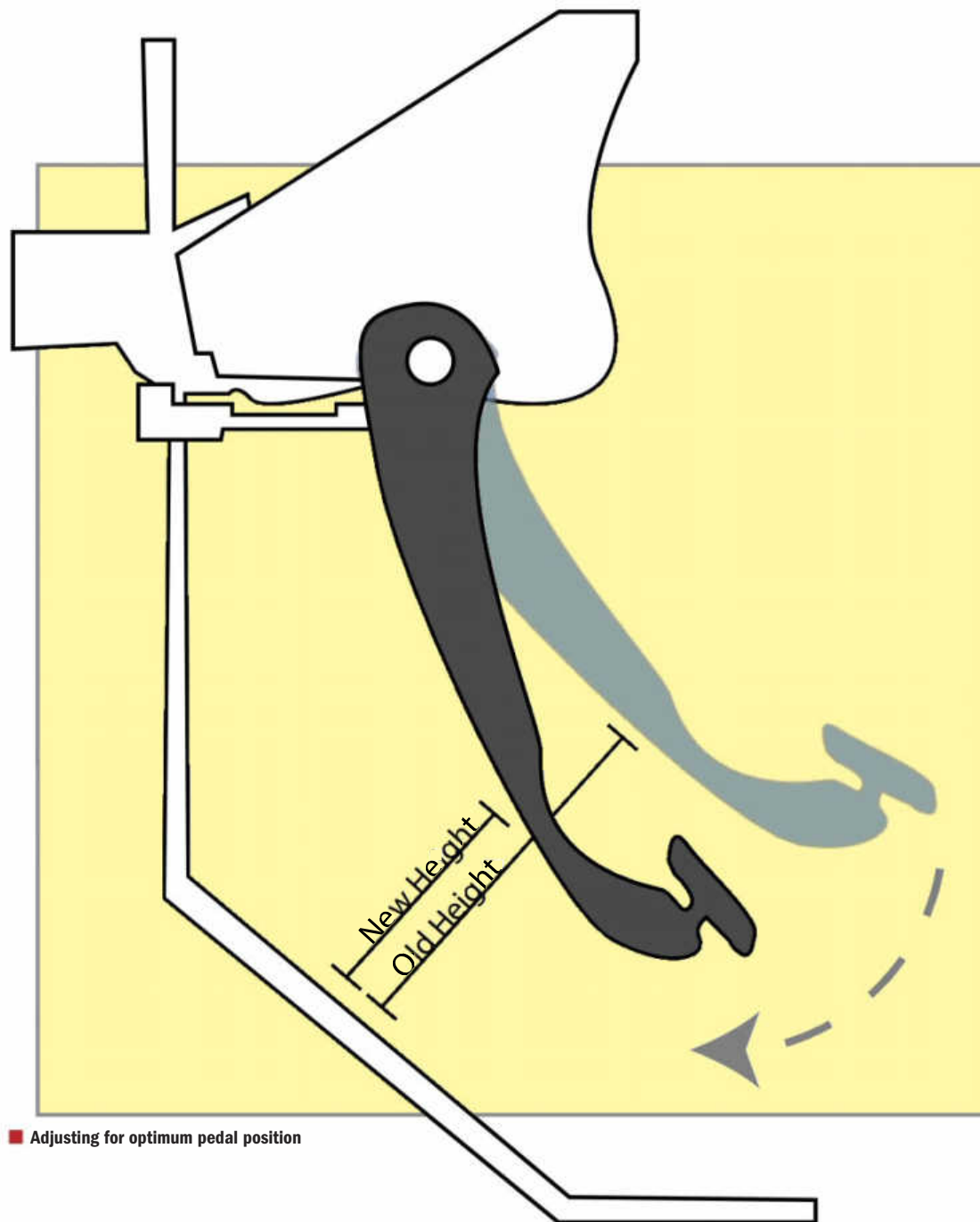


**FURTHER FREE PLAY IS NEEDED TO COMPENSATE FOR WEAR AS THE FINGERS MOVE GRADUALLY TOWARD THE BEARING. THEN, CONTROLLING THE AMOUNT THE BEARING MOVES ON ITS SLEEVE IS ANOTHER CONSIDERATION—IF IT MOVES TOO FAR IT WILL COLLIDE WITH THE CIRCLIP ON THE END OF THE PISTON SLEEVE—NOT FAR ENOUGH AND IT WON'T DISENGAGE THE CLUTCH.**

the condition in which the system should be re-bled. As the adjustment screw is turned out and the pedal is depressed, the fluid flows into the adjuster and pushes the piston back.

Once the cylinder is full, the remaining fluid is routed to the hydraulic bearing. This essentially introduces free-play to the pedal travel and lowers the point where the clutch engages, allowing the driver to adjust the pedal to the most comfortable driving position. A lower pedal also quickens clutch response.

A bonus feature of this adjuster is its ability to control the travel distance of the release bearing. This prevents over-travel of the clutch fingers, which can lead to clutch malfunction at higher engine rpm.



■ Adjusting for optimum pedal position

### Adjusting Pedal Height on Competition Clutches

Also worth noting, original equipment manufacturers use pre-loaded release bearings that are in constant contact with the clutch's diaphragm fingers, while competition-style bearing makers do not. By contrast, they seek maximum clutch clamping force, and therefore, require some free-play between the clutch release bearing and the fingers.

Further free play is needed to compensate for wear as the fingers move gradually toward the

bearing. Then, controlling the amount the bearing moves on its sleeve is another consideration—if it moves too far it will collide with the circlip on the end of the piston sleeve—not far enough and it won't disengage the clutch. Ram's pedal-height adjuster is aimed at simplifying the process and ensuring the success of the competition clutch. **MD**

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**I had a realization** as I hammered down the back straight of one of America's most fearsome tracks—Circuit of the Americas—with the speedometer touching the scary side of 140 mph: The outgoing Cadillac CTS-V is one of the most underrated cars of the last decade. This was a realization I had many times throughout the next week as I said farewell to the stunning Caddy by driving it from the F1 track in Austin, Texas to my home in Portland, Oregon.

The journey wasn't just a great way to say goodbye to one of the finest performance machines ever produced in an American factory, but a fantastic opportunity to show off CTS-V's stunning combination of sports car finesse and muscle car brute force.

### **On the Track**

My time with the CTS-V began in Austin, where Cadillac was hosting what it called an Irish wake to celebrate the outgoing car. It couldn't have chosen a better place; after all, Circuit of the Americas is much like the CTS-V itself: a fresh American take on a classic European formula.

In the case of the CTS-V, Cadillac took the classic sports sedan formulation of luxury and handling and added American brawn in the form of a 6.2L V-8 with a 1.9L supercharger bolted to it. This insane combination puts out 556 horsepower and 551 thundering pound feet of torque straight to the rear wheels.

■ Driving the Cadillac CTS-V fast is like flying a high-performance aircraft, it can be challenging, even exhausting, but extremely rewarding.





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Small block Chevy **SportComp** rockers come in standard offsets (0.130 in/ex) or for entry-level 23-degree aluminum cylinder heads, T&D offers the "220" set (0.220in/0.130ex) and ratios (1.50 and 1.60).

Ford small block **SportComp** rockers come with standard offsets and ratios (1.60 and 1.70).

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On Circuit of the Americas' elevation changes and undulating corners, this fearsome combination can be a real handful. With the traction control off, the adaptable suspension and transmission in full attack mode, the CTS-V becomes shockingly aggressive.

Like a fighter jet, the CTS-V feels like it was designed to constantly ride the knife's edge of stability. With fast, communicative steering, savage shifts and an incredibly firm suspension, the Cadillac can change direction like a housefly.

Sure, keeping the big Caddy on the track is a full-time job, but that's also what's special about the car. Modern performance cars have so many electronic nannies that they can nearly drive themselves, which makes it easy to pilot them, but it's also much less fun. The CTS-V, on the other hand, has a distinctly old-school feel to it. Cadillac has given the driver a yacht-load of power, an incredibly stiff platform and a race-style suspension, and told them to go outside and play.

Truly, I haven't driven anything like it, before or since. Even on Circuit of the Americas' long straights, where speeds kissed 150 mph, the Cadillac never stopped accelerating, and in the corners it might have been a handful, but it was rewarding and fast, very fast.

## On the Open Road

After a satisfying day thrashing the CTS-V on Circuit of the Americas, it was time to undertake the real challenge I had come to Austin to attempt, driving the big Caddy the



■ **Standing alone in the California desert, the CTS-V's "art and science" design language makes it look like a high-tech escapee from Area 51.**

2,490 miles from East Texas to my doorstep in Portland. During that long drive, I would find myself accidentally off-roading, sleeping in an \$80,000 car mere miles from Juarez, Mexico—the drug murder capital of the world—and enjoying every second of supercharged V-8 power.

The first leg took me across Texas and into New Mexico, where I stayed with family in a town 100 years removed from its glory days of silver mines and gunfights, Silver City. To get there meant a long night drive across some of the most boring roads that North America has to offer, long, straight stretches of Texas freeway.

Fortunately for me, the speed limits were high, and I was able to take advantage of a classic Cadillac virtue, comfort at passing speeds. The CTS-V and I simply ate the miles, but by 2 o'clock in the morning my focus was fading, and in a car with 556 horsepower that's a potentially lethal condition.

However, I was still dangerously close to Juarez, an area unfortunately known for its heavy presence of the world's least friendly drug cartels. With the trip on a shoestring budget, I decided to forgo a hotel, but sleeping in the car in this area seemed foolhardy at best. With this in mind, I marshaled my energy—and energy drinks—for a final push. Finally slogging into New Mexico and finding a likely pull-off, I decided to get some glorious sleep. Thankfully Recaro doesn't just make seats that are good for racing, they also make a surprisingly good bed.

I woke up refreshed, with the desert sunrise streaming into my \$80,000 "hotel room," ready for another day of adventure.

The next two days took me through desert vistas, spectacular thundershowers, and even a parking lot full of rusting tanks, on a chorus of V-8 roar and supercharger howl.

It wasn't until I was on the second-to-last leg of the journey that I encountered anything like the adventure I found in my first day in the Cadillac.

As I was traveling along I-5 in Central California, surely one of the most boring stretches of freeway in the entire country, even the intoxicating acceleration of the CTS-V was wearing thin. On a whim I pulled off the freeway to take a break, and found to my surprise and delight that the satellite navigation had found an entirely different route for me.

Heading off into the wild blue yonder on a back road, I quickly lost my cell phone signal, and shortly thereafter the





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pavement. The road surface still seemed pretty good, and the navigation was telling me that I had an intersection with what appeared to be a more major road coming up in a

■ **The CTS-V handled itself well in just about every environment, even a little unplanned jaunt on dirt and gravel roads didn't faze it.**

few hundred yards. So, undeterred, I pressed on.

Unfortunately, what appeared to be an intersection with a major road turned out to be an essentially nonexistent cow

path wandering off into the drought-blasted hills. Still, I didn't want to give up, and the navigation was again telling me that another intersection was a mere ½-mile further up the road.

Perhaps unsurprisingly, this set of circumstances repeated itself a few more times, until the question became just how much further I dared press on. Just as I was about to give up, tail tucked between my legs, I saw it, just across a small creek running across the "road" was the most stunning strip of pavement I had ever seen.

Illuminated by a ray of sun, it was as if the driving gods had brought me here. So, carefully fording my last obstacle, I prepared for what would be one of the most memorable driving experiences of my life.

The long two-lane road went from blighted pastureland into a perfect canyon, in an ever-tightening series of curves laid out as well as any race track. The CTS-V was perfectly in its element, with monstrous acceleration, fearsome braking and the perfect hint of oversteer as the car clipped apex after apex.

## Conclusion

During the rest of the journey home I had a chance to reflect on that moment; it was the perfect cap to an amazing trip and an astounding car. The outgoing Cadillac CTS-V should be remembered as something truly special, a car that combined traditional American performance with unprecedented refinement.

The new Cadillac CTS-V is likely to be better in nearly every measurable way, but it will have its work cut out for it when it comes to improving on the combination of raw, unbridled muscle car power and sports car handling that make the current generation so special. Personally, I can't wait for the second generation CTS-V to slip enough in price that I can lay my hands on one, but this time with a manual transmission. **MD**

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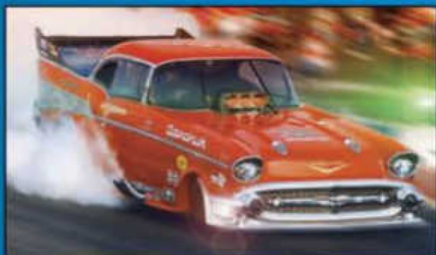
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# 200 MPH IN A MODERN MOPAR

Karl Schello's ShockWave Challenger

BY LOU LETO ■ PHOTOS BY GUY SPANGENBERG









## Let's put it out there right now:

Affable Karl Schello is no mellow fellow. He can't be when setting a goal to gain a 200-mph hat, with the bragging rights to be the first modern Mopar pilot to break the magic 200 barrier in the standing mile. He's earned that title and isn't resting on his laurels. There are new goals that can only be accomplished through dedication, assembling a unique team of focused individuals, and the necessary investment of time and funds required to push the envelope while raising the bar for Mopar fans near and far. He also acknowledges the support of his wife Vani.



■ The parachute is not for show; it complements the huge brakes for maximum “whoa” of a 4,600-pound Mopar missile.



Where does Karl begin? “My first impression of cars was formulated by my Grandpa ‘Big John’ Broussard, in my birthplace of New Iberia, Louisiana,” Karl said. “He had a cool-looking ’53 Cadillac Coupe de Ville that he took me for rides in. Later, while still little, I would sneak into the seat of a ’69 Z/28 owned by my cousin and practice shifting.”

Karl and his family moved to California, and he was bit by the horsepower bug. He built a ’62 Nova hot rod as his first car, and followed it up with a ’65 Nova. He had his Tri-Five moment with a Handyman. Next, Karl jumped over to the custom car scene with a chopped-top ’63 Caddy project, and then moved on into lowriders.

With a focus on business and family, he took a voluntary break from playing with cars in



2002, until he spotted a new Challenger on the road. “I didn’t know what it was, but it said ‘Dodge’ on the back.” He went to the local dealer to learn more, a very greedy dealer who wanted to charge a substantial premium for the then hard-to-get cars. “He quoted \$75,000, so I walked.” He found another dealer who allowed him to test drive an R/T edition, but he wasn’t completely impressed with the experience. “I could feel that it had potential. I ordered one in Tor Red and took delivery in January of 2009. It was my daily driver to my moving and storage company 65 miles away, just as I intended.” Taking advantage of the SRT Experience offered to all new owners, he drove at Willow Springs Raceway, and he was hooked. The double-down moment for the Dodge owner was when he learned his neighbor drove for NASA events, so Karl became a road racer, running stock with the exception of coil-overs and Nitto tires.



I BASICALLY BLEW THE ENGINE IN THE BURNOUT BOX, BOUNCED OFF THE REV LIMITER, **AND THE RESULTANT INTERNAL DAMAGE WAS TWO DESTROYED VALVES AND FIVE BROKEN PISTONS THAT WIPED OUT THE ENGINE.**

In 2010, he changed direction again. To get more power from the Mopar, he bolted on a Kenne Bell supercharger to his 100% stock engine, and a modified valve body in the automatic transmission. He kept dialing in blower boost until it was 16.5 pounds, enough to make his goal to crack into the 10-second category in the quarter-mile (a best of 10.8 E.T. at 128 mph).

Then he learned about the inaugural Mojave Mile event in 2010. He attacked the standing mile with the same 16.5-pound boost on the stock engine, but he did swap the rear tires to Nitto Drag Race 315x35x20s to go through at 183 mph. Karl named his car ShockWave.

Later, back to the dragstrip to become a better racer, “I basically blew the engine in the burnout box, bounced off the rev limiter, and the resultant internal damage was two destroyed valves and five broken pistons that wiped out the engine.”







The image of receiving a 200-mph hat became the all-in, singular focus. A new engine, a 393-ci Mopar motor built off of the 6.9L architecture, was the base. The compression was upped to 10:1. Innards included a Scat crankshaft, Crower billet rods, CP pistons, and back to Crower for the cam. A larger supercharger, a 4.2 from Kenne Bell, was the topper. Dyno pulls with 23 pounds of boost revealed 1,070 hp at the rear wheels, an estimated 1,270 at the crank. Karl felt he was ready, so he took the Challenger from his garage in Palmdale (California) to the Texas Mile event.

At these events, safety is paramount, with mandated safety passes at certain speed limits. “I attempted the first pass with their designated 145–165-mph range at the timed half-mile, and blew through at 165.3. They were going to ban me right then for excess, but I spoke honestly about not knowing the full power capability of my new setup. The officials relented, and in my second safety pass, to be in the 185–199 range, I registered 193.1 mph,” Karl said. “The next pass was approved at Unlimited, so I let her loose. With the big pulley on the supercharger, it was flying until fifth gear, and I felt it nose over, with no more pulling power.” The time slip read 199.2 mph. Diagnostics indicated that the ECM

**FINAL TIME SLIP: 200 MPH.  
SCHELLO SAID HELLO TO  
BRAGGING RIGHTS AS THE  
FIRST 200-MPH MODERN  
MOPAR (MARCH 2012).**



was going into limp mode. The typical racer story ensued of friends in faraway places with the proper but rare parts remedy, and the need for a seven-hour round trip to retrieve. Preparations for a final pass included borrowing rear tires, a swap with another helpful racer friend for increased diameter (taller tires) to assist the 3.06 rear gears. The drama continued during the end of the day, last pass. Pedal to the metal, Karl overshot the mile marker, downshifted at an rpm that “lifted the head gasket” to prevent running off the end of the course. Final time slip: 200 mph, and Schello said hello to bragging rights as the first 200-mph modern Mopar (March 2012).

Parts exchanged prior to the next event included new heads, with a dyno pull that took out

■ **Tor Red is an appropriate paint color, because this torrid Challenger challenges the laws of physics. The Shockwave front emblem was custom-made by Heidi of Billet Technologies.**

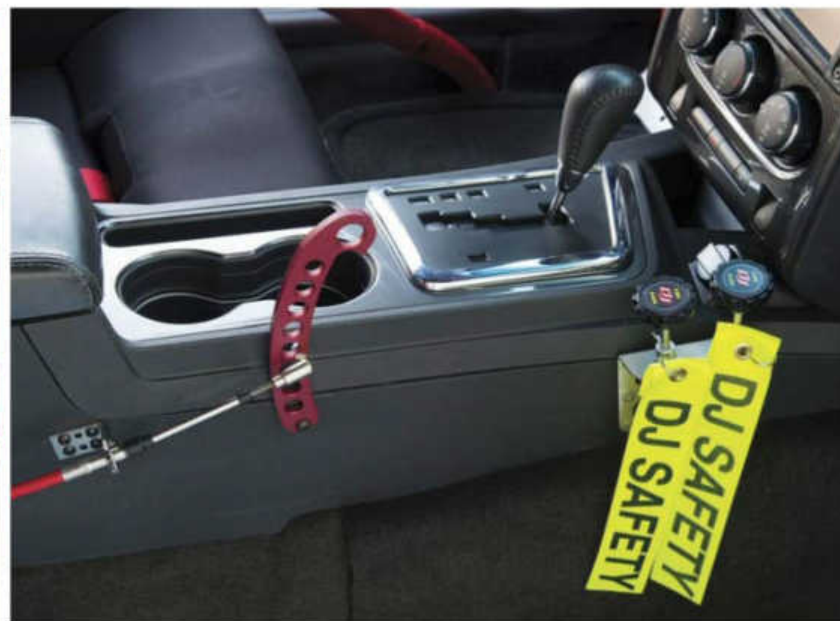


another head gasket, just one week prior to the 2012 Mojave Mile. TCMs presented another challenge, with Karl and company going through five attempting to go over 6,500 rpm. The sixth rewarded them with a best run of 201.7 mph.

At the end of 2012, Karl decided upon a completely new direction: new engine builder Chris Seidle (Seidle Motorsports in Virginia); a new tuner, AJ Berge aka “Hemi Tuner” (from New York) and a new engineer/crew chief, Cam Chevroux (Crank This Performance in Riverside, California). “We decided upon a stout engine with a lot of one-off stuff,” Karl said. “That included choosing a 100% bare set of Gen 3 alloy head castings that were painstakingly worked over by Brian Mulhoney, with his own design for the chamber and valve angle, which would be capable of maximum flow and accepting high boost.” Karl



■ Each pre-run procedure includes adding ice to the rear tank, plumbed forward to the supercharger intercooler.



**DODGE FANS, AT CLOSER INSPECTION, WILL NOTICE THAT THE ORIGINAL FRONT SPOILER IS ELIMINATED, EXCHANGED FOR AN LP RACING SPOILER THAT JOINS TO A CUSTOM BELLY PAN.**



admits, “I am a cylinder pressure guy,” evident by the 10:1 compression, and the 168x103mm throttle body that feeds a special Kenne Bell 4.7 twisted-vane Bigun supercharger that Karl claims “is a blower capable of nearly 35 pounds of boost, if necessary.” He can barely contain his enthusiasm as he states, “on the dyno at 19 pounds of boost with a 4-inch pulley, it showed 1,110 rwHP. I am really excited about the potential of this engine.”

Sitting at rest in the pits, what does ShockWave look like? Basically an '09 stock-bodied Dodge. The obvious is the purpose-built, Pro Stock-type aerodynamic rear wing/extension. Dodge fans, at closer inspection, will notice that the original front spoiler is eliminated, exchanged for an LP Racing (Ontario, California) spoiler that joins to a custom belly pan. There is a custom-built fiberglass hood. The facelift is enhanced by a Plexiglas panel that blocks the





■ While safety is paramount, the roll bar system shares space with intact factory creature comforts.

## THE CHALLENGER COCKPIT IS NOT WHAT ONE WOULD EXPECT IN A RACE CAR.

grille, which means there is no air flow during passes. A custom Jolván three-row, dual-pass radiator; Evan waterless coolant and B&M coolers on all systems control cooling challenges. The pre-pass regimen also includes turning on two electric fans before each run and pouring ice into the trunk well-mounted, 13-gallon tank that pumps frigid water to the intercooler for the supercharger. The 19-inch wheels are custom powder-painted and built by Forgestar (nine wide in front, 11 in the rear). Tires, by Hoosier, are 265 35 (front), with a taller 315 40 size out back. Suspension is controlled by custom-built AGP double adjustable coil-overs. The rearend is still stock, with 3.06 gears.

The Challenger cockpit is not what one would expect in a race car. Looking past the full cage, the Corbeau seat and the missing passenger seat, the interior remains virtually stock, from the dash to the steering wheel. Even the console and door panels are intact. The factory floor mats and the rear seat are still there. “They call me ‘the safety Nazi.’ DJ Safety has always been a full







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Creature comforts are intact. The headlights shine through the tinted Plexiglas grille panel, and the windows are power actuated. “The DVD player still works; I can watch movies in the pits,” Karl said excitedly. Perhaps his favorite

■ The wickedly clean engine compartment reveals a Bigun 4.2 supercharger; serious horsepower awaits.



film might be “Fast Five,” since the engine sounds for Vin Diesel’s car were dubbed from 12 hours of recordings of Karl’s Challenger. You might catch a glimpse of the red vehicle’s further Hollywood participation, appearing in the opening and closing scenes of “Fast 6” and “Born to Race.”

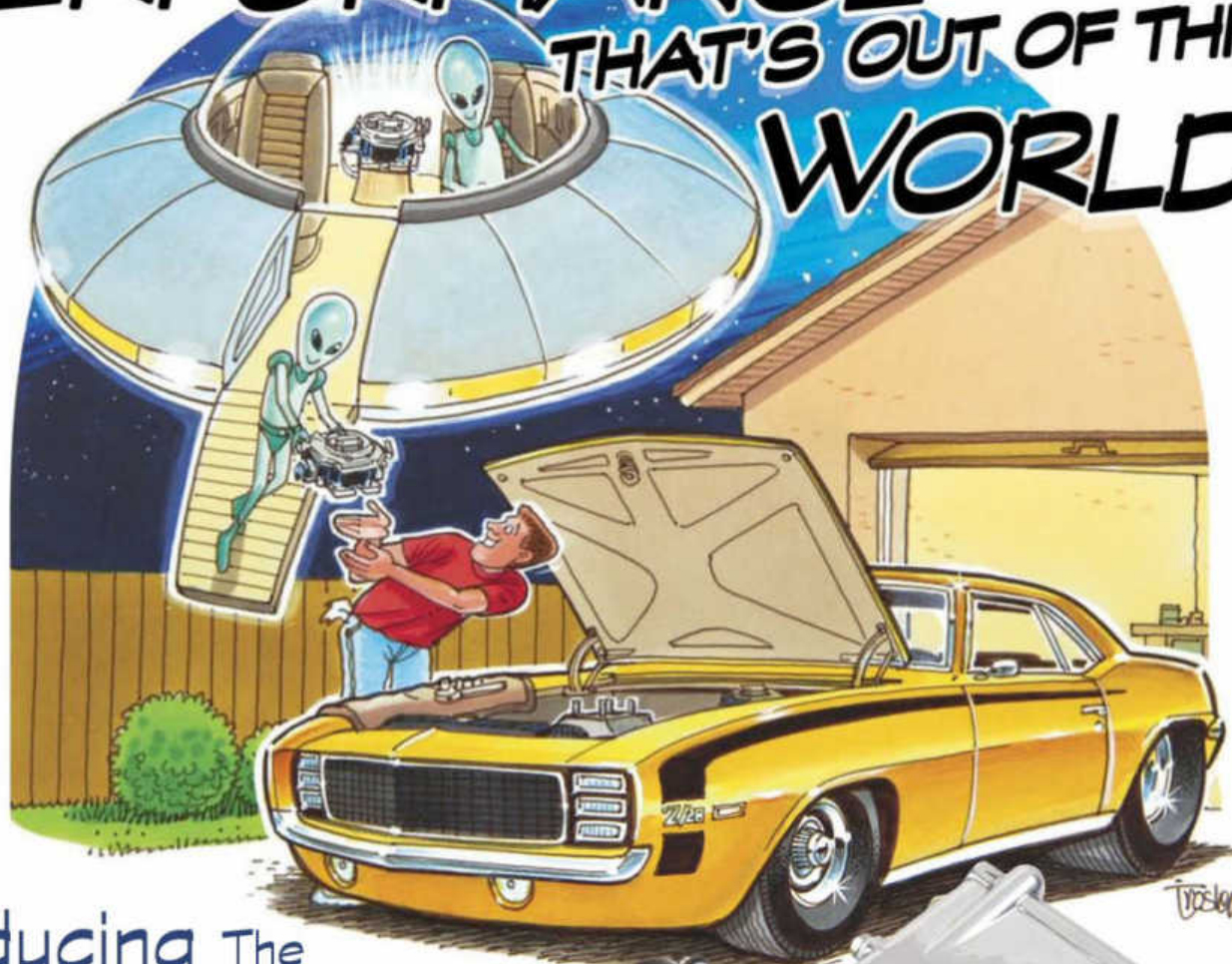
Karl admits to not being in the car since 2012, “We did two up-and-back, low-boost shakedown on a back road prior to the April 2015 Mojave

Magnum.” On the Mojave airport runway, his “test” run off the trailer during the Magnum was 203 on C16 fuel, “with the TCM causing the 1-4 shifts of the automatic transmission at 6,250, with fifth gear coming in at 5,650.”

His long-term goal? “With AJ building custom TCMs to allow 7,500 rpm, 225 has a nice ring to it.” In October, Karl and crew return to Mojave. Stay tuned for the next shockwave caused by his red rocket. **MD**



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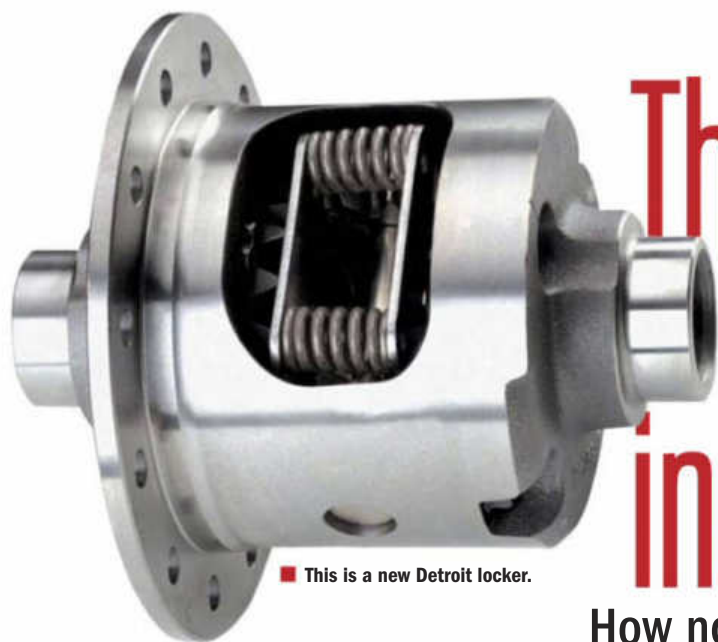
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# The GEARS in the REAR

## How not to Spin Your Wheels

BY DAN BURRILL ■ PHOTOS BY DAN BURRILL  
AND COURTESY OF THE MANUFACTURERS

**My differential education** began one fall day when I went to an automotive swap meet in my new muscle machine with its big V-8 engine. Parking was on the wet grass across from the event. After walking around, visiting with vendors and buying a few goodies, I returned to my car, started it up and proceeded to pull out of the space. Of course one rear wheel spun on the grass and the other wheel didn't do anything, so the car didn't move.

Once I got free, I drove up to see Dan Sudul, owner of Dan's Gears in Sherwood, Oregon. I asked him about the differential I currently owned, and what my options were. I knew there were different types of differentials available, and I figured Dan's Gears was a good place to start.

"Well, first of all, you have what is called an open differential," Dan said. "What that means is that when one wheel has some traction loss—like being on the wet grass—with an open differential all of the power is shifted to the spinning tire."

He went on to say that with an open differential power is transmitted to the axles via a set of simple gears in the differential/ring



■ "This is a 14-bolt full float Chevrolet differential. We pulled out the spider gears and installed the Detroit Locker in the standard carrier," Dan Sudul said.







■ This is a new Eaton limited slip showing the helio gears.



gear housing. These gears allow for one axle to spin at a different speed from the other, which is necessary when negotiating tighter turns. When driven-wheel traction is more or less equal, like on a paved road, power is distributed equally to both wheels.

“If one wheel loses traction significantly enough to cause the wheel to slip on the road surface, power will then be transmitted wholly to that wheel until even grip is restored,” he said. “Getting off the gas, which reduces power to the drive wheel, is the quickest way to stop the wheel spin, but it doesn’t do much for getting the vehicle going rapidly again in a forward direction.

### Locker, Limited, Torque Sensing or Posi?

So which is the best differential? Dan told us that it depends on what you want to do with the vehicle. Let’s start with the



■ Next up is an Eaton Trutrac. It’s a limited slip with no clutches or special additives, with helical-cut gears.



■ Ford’s new 8.8-inch posi is a very popular unit due to price and performance.

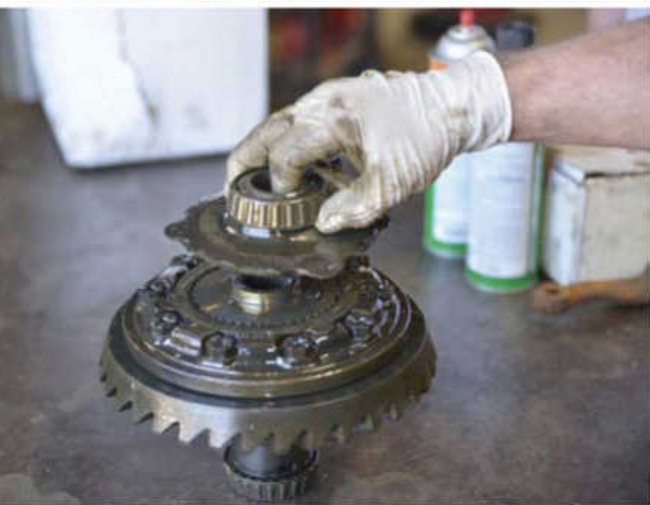
differences between locking, torque sensing, limited slip and positraction (posi) differentials.

The difference between the various designs is that a limited slip, or posi-traction differential, sends power to the non-drive wheel based on input torque, which is power coming to the axle from the engine. In some respects, limited slip and positraction are very much the same. They may be a clutch disc or clutch-cone design, but they engage when one wheel has more traction than the other. The differential diverts power to the wheel with less traction, but they are limited.

In contrast, locking and torque-sensing rear differentials equalize the gripping and slipping wheels together based on different wheel speeds, regardless of engine power input. This is accomplished through gears that engage as wheel speeds differ.

The difference is subtle, but it means that with a limited slip





■ This is a factory Ford 9-inch track locker. As you can see, this is a broken unit. The track lockers have a two-piece side gear, but unlike the aftermarket units, all of the clutches are on one side, and the case is thinner; hence, they break with hard use. These are not considered to be as good as the aftermarket units.

unit, when high torque is applied to the differential and transferred to the axle, the spring-loaded clutch pack clamps the gears to the differential cage. This may happen through a ramp or the natural tendency of gears to want to separate under torque. The clamping action is in proportion to the torque delivered, which means that the higher the torque, the higher the clamping load. With a locking or torque-sensing (Torsen T-1 or T-2) differential from Torsen, Eaton Truetrac or Quaife, it's not the torque, but the difference in wheel speeds that does the clamping.

One point to keep in mind is that the smaller Eaton posi or limited slip, such as the type that is fitted in the Ford 8.8

## FORD 9-INCH OPTIONS

IF YOU ARE PUTTING out a lot of power and you are running a 9-inch differential, you might want to consider a beefier or specially built housing. There are a number of good models on the market, but we examined two examples here.



■ This Nitro Gear billet Ford 10-housing is called a third-member. It's based on the ever-popular Ford 9-inch housing. This housing is billet machined from a single round of high-strength, aircraft-grade aluminum. Countless options exist because it's designed to accept aftermarket 9-, 9.5- or 10-inch 35-spline ring-and-pinion sets and standard aftermarket 9-inch-type spools and lockers.



■ Another option is the Spicer third-member for Ford 9-inch applications. This bolt-in unit is designed to provide peak performance in off-road, street rod, circle track or racing vehicles. The premium-grade aluminum option is lightweight and built for speed, while a nodular iron option ensures excellent handling in rougher conditions, such as running the Baja 1000. Both options are backed by Dana!



■ This GM factory unit comes as an option in the Camaro or S-10 Chevrolet. These are considered good units that come with helical-cut gears, which are basically the same as an Eaton Truetrac.

rearend, is a clutch type, whereas the Detroit Locker is a gear type. Dan went on to explain that one way that the Detroit Locker is different is that when it locks in, it won't release until you let off on the pressure, such as getting off the throttle. A Locker is positive, when it locks in both tires will respond equally when the vehicle is accelerated. Once the wheels are locked in then that's it. In fact, you can take one axle out, or if you break an axle, it will still drive, where a torque-sensing differential will not. A Detroit Locker is a true locking differential.

It's worth mentioning that you can also find viscous coupling differentials in many late-model cars; these simply use thick fluids to encourage both wheels to turn at the same speed regardless of

■ The new Chrysler 9.25-inch ZF rear limited slip differential is part of the high performance series. It features a 12-bolt, ZF rear, 2010-present and 31 spline with gear ratios of 2.71:1 and up for Chrysler and Dodge.





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15x4	\$59	\$79
15x5	\$59	\$79
15x6	\$59	\$79
15x7	\$59	\$79
15x8	\$69	\$89
15x10	\$99	\$119
16x7	\$109	\$129
16x8	\$124	\$144
Caps	\$15	
Trim Rings	\$20	



CHROME



SILVER



## PAINTED GENIES, ARTILLERY & O.E.

GENIES

ARTILLERY

O.E.



BARON RED

GLOSS BLACK

BARON RED

GLOSS BLACK

FLAT BLACK

Hubcaps not included for prices shown on Genies, Artillery & O.E.

SIZE	Genie Gloss Black	Genie Baron Red	Artillery Gloss Black	Artillery Baron Red	O.E. Flat Black	O.E. Baron Red
14x6					\$104	\$104
15x5	\$114	\$114	\$144	\$144	\$104	\$104
15x6	\$114	\$114	\$144	\$144	\$104	\$104
15x7	\$119	\$119	\$149	\$149	\$109	\$109
15x8	\$119	\$119	\$159	\$159		
16x4.5	\$144	\$144				
16x6	\$149	\$149				
17x7			\$249	\$249		
17x8			\$259	\$259		
17x9			\$264	\$264		
Trim Rings	\$20	\$20	\$20	\$20	\$20	\$20

## PAINTED SMOOTHIES



BARON RED

CAMEL

GLOSS BLACK

SIZE	Backspace	PRICE
14x6	3.25"	\$109
15x5	3.25"	\$109
15x6	3.75"	\$109
15x7	4.125"	\$109
15x8	4.25"	\$114
16x6	4"	\$119
16x6.5	Fits HHR & PT Cruiser	\$129
16x7	Fits HHR & PT Cruiser	\$119
Trim Rings		\$20

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CHROME

SILVER MACHINED

SIZE	Rodder SILVER	Rodder POLISHED	Rodder CHROME
17x7	\$99	\$125	\$149
17x8	\$99	\$125	\$149
17x9			\$159
18x7	\$99	\$125	\$179
18x8.5	\$99	\$125	\$179
18x9			
18x9.5			\$209
20x8.5			\$209
20x9			\$235

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CHROME

GUNMETAL

SIZE	Old School GUNMETAL	Old School POLISHED	Old School CHROME
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15x7	\$99	\$129	\$135
17x7	\$119	\$145	\$160
17x8	\$119	\$145	\$160
17x9.5	\$154	\$189	\$214
18x7	\$135	\$170	\$210
18x8	\$135	\$170	\$210
18x9	\$159	\$194	\$219
20x8.5	\$160	\$195	\$235
20x9.5	\$160	\$195	\$235



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traction conditions. There are also modern electronic differentials that use electronic inputs from the wheel speed sensors to actuate clutches while the traction control system applies the brake on a spinning wheel to equalize torque distribution.

Lastly, we should mention the spool, or welded differential. They come in two sizes, the mini spool and the full-size spool. The mini spool is considered the “poor man’s spool,” however they are both considered inexpensive compared to the others. Both of these are locked up solid. There is no give. For all intents and purposes, the axles are locked



■ On the left is the full spool and on the right is the mini or “poor man’s” spool.

together at all times. These units are mainly preferred for straight-line maximum traction; they pull a tremendous amount of power out of the car during cornering because one tire must be dragged around at the wrong speed.

“These [welded differentials] are ideal for drag racing,” Dan said. “You can’t take a curve effectively because one axle is not free to turn faster than the other one, causing the rearend of the car, that is to say the outside rear wheel of the car, to chirp or hop around a curve.”

There is a lot of competition in the differential

arena, which means there are a lot of choices. Eaton has become a big player in producing performance differentials. Many of its differentials feature a patented carbon friction material originally designed for racing brakes and clutches. Made from high-temperature carbon fiber wrapped with carbon anti-wear coating, the discs are virtually indestructible, according to Eaton. Despite repeated hard use, there is no loss of performance. Eaton’s warranty says that the patented carbon material provides smooth, quiet operation over the life of the vehicle.



## SOURCES

**Dan’s Gears**  
P.O. Box 1338  
Sherwood, OR 97140  
503.692.1547

**Nitro Gear & Axle**  
509.888.2953  
Nitro-gear.com

**Dana Axle & Spicer Drivetrain**  
800.621.8084  
Spicerparts.com

**Auburn Gear**  
260.925.3200  
Aftermarket.auburngear.com

**Wavetrac Differentials**  
949.362.8700  
Wavetrac.net

**Eaton Performance Products**  
800.328.3850  
Eatonperformance.com

**OS Giken USA, Inc.**  
310.986.6620  
Osgiken.net

**Torsen**  
585.464.5000  
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■ The multi-patented Wavetrac differential gives incredible traction improvements with no trade-off in drivability. These are very popular units with a good track record.





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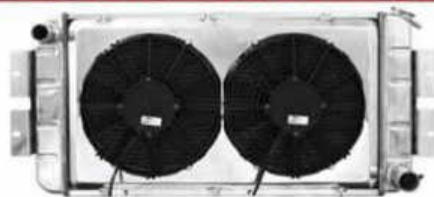


V8 mount pictured



6 Cyl mount pictured

**BEL AIR CROSSFLOW**



Shroud & Fan package pictured. Also available without shroud/fans.

**CAMARO**

'67-'92 CAMARO / Z-28



'69 427 Pictured

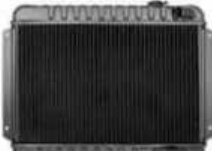
'67-'81 CAMARO



'67-'69 Pictured

**CHEVELLE**

'64-'71 CHEVELLE



'65 327 25" Pictured

'64-'88 CHEVELLE



'64-'67 25" Pictured

**BUICK**

'62-'76 SKYLARK / RIVIERA



'64-'71 Pictured

'64-'71 SKYLARK



'64-'67 Pictured

**IMPALA / FS CHEVY**

1958 - 1970



'64 409 Pictured

1959 - 1968



'61-'63 Pictured

**EARLY CHEVY**

1937 - 1954



'39 - '41 Pictured

1946 - 1954



'49-'54 Pictured

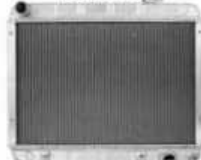
**CHEVY II / NOVA**

1962 - 1974



'66-'67 283/327 Pictured

1966 - 1974



'66-'67 327 Pictured

**DODGE / PLYMOUTH**

1966 - 1976



'66-'69 22" Pictured

1966 - 1969



'66-'67 26" Pictured

**MUSTANG**

1964 1/2 - 1993



'67-'69 20" Pictured

1965 - 1993



'68-'70 24" Pictured

**CHEVY TRUCK**

1948 - 1987



'63-'66 24-3/4" Pictured

1948 - 1980



'55-'59 Pictured

**FORD STREET ROD**

1928 - 1951



'32 Pictured

'32-'35 & '40-'41



'33-'34 Pictured

**FORD TRUCK**

1948 - 1972



'48-'52 Flathead Pictured

1948 - 1956



'54-'56 Pictured

**OLDSMOBILE**

1964 - 1974



'68-'70 442 Pictured

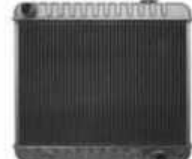
1964 - 1971



'65-'71 28" Pictured

**PONTIAC**

1961 - 1992



'64 24-3/4" Pictured

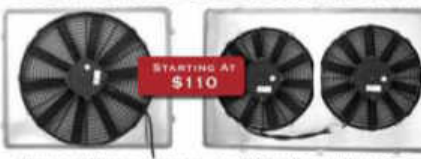
1961 - 1981



'66-'67 GTO Pictured

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# ROOTS ROADSTER

Zeke Zacherson's 1929 Ford Roadster  
Keeps it Real

■ BY ALAN GALBRAITH











■ Using vintage technology can result in records set and held.

**Zeke Zacherson's '29** roadster was part of the retro movement at Bonneville before there was a retro movement at Bonneville. Zeke chose to do battle in a class designed specifically for engines designed before 1959 at a time when the latest and greatest engine technology was all the rage. His '29 Ford roadster is an icon of the return to the roots of hot rodding.

Fashion trends come and go in a flash. The must-have outfit for spring is no longer acceptable come fall. The same can be said for engine choices at Bonneville, although the trends on the salt follow a much longer cycle. The history of land speed racing at Bonneville is also a history of the highest performance engines available at the

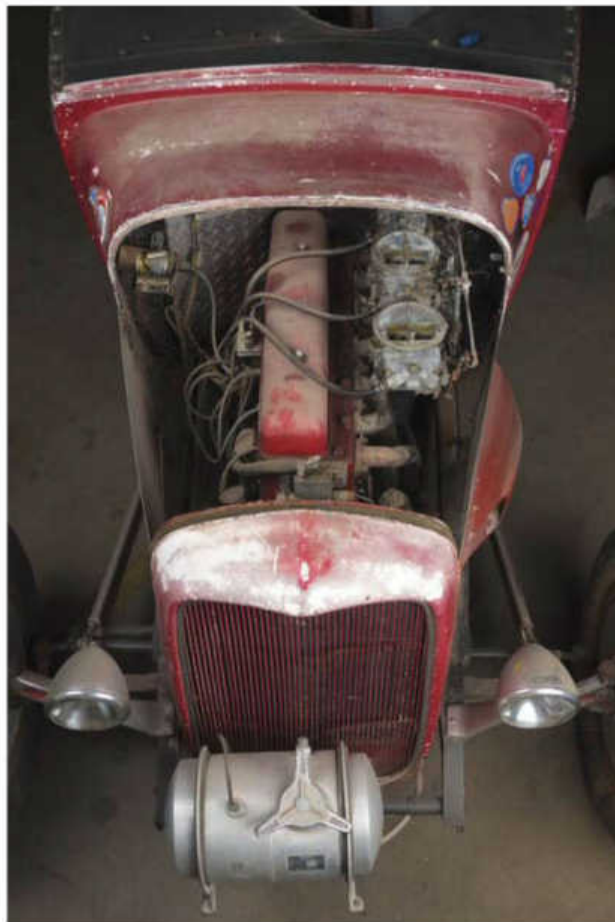
THE HISTORY OF LAND SPEED  
RACING AT BONNEVILLE IS  
ALSO **A HISTORY OF THE  
HIGHEST PERFORMANCE  
ENGINES AVAILABLE AT  
THE TIME.**





time. Interest in land speed racing was huge in the '50s and '60s, with advancements in automotive technology pushing records higher and higher. By the mid-'70s the automotive world shifted emphasis from performance to economy, and this malaise had crept into the scene at Bonneville. Participation dropped off to all but a few die-hards running their cars using the latest technology. Fewer still looked back in time to nearly forgotten engine designs. When Zeke acquired the Bonneville veteran roadster he became one of those few.

Zeke caught "Salt Fever" in the mid-'70s when a friend let him drive a small-block-powered roadster. After hitting 149-mph, Zeke was hooked and vowed to return with his own car. Previously the



■ Modifications throughout the years included updating the roll cage and changing out cylinder heads.

FEWER STILL LOOKED BACK IN TIME TO NEARLY FORGOTTEN ENGINE DESIGNS. **WHEN ZEKE ACQUIRED THE BONNEVILLE VETERAN ROADSTER HE BECAME ONE OF THOSE FEW.**



governing bodies had seen an opportunity to bring more competitors to the start line by creating a new class for older engine designs. Zeke seized this opportunity by retuning to the salt with his street-driven '38 Chevy sedan converted to race car duty and managed to set a couple of records. Armed with knowledge gained setting the XXO/Sedan class records and hungry for more, Zeke started looking for a car to compete in the Roadster body class (Bonneville classes are divided by engine type/displacement and body style).





■ The Bonneville rule book mandates a fire extinguisher system and a working horn.

The roadster Zeke found had started life as a magazine project feature. Frank Oddo, a long-time automotive journalist and hot rodder, built the #29 roadster in the mid-'70s while documenting the build for series of articles in *Street Rodder* magazine. Once completed, Frank took it to Bonneville and went faster than 180 mph with a blown small-block Chevy V-8, from the legendary Bonneville figure Bruce Geisler, under the hood. The project and story complete, the car was sold to Lloyd Arnold, who replaced the




---

**ONCE COMPLETED, FRANK TOOK IT TO BONNEVILLE AND WENT FASTER THAN 180 MPH WITH A BLOWN SMALL-BLOCK CHEVY V-8, FROM THE LEGENDARY BONNEVILLE FIGURE BRUCE GEISLER, UNDER THE HOOD.**

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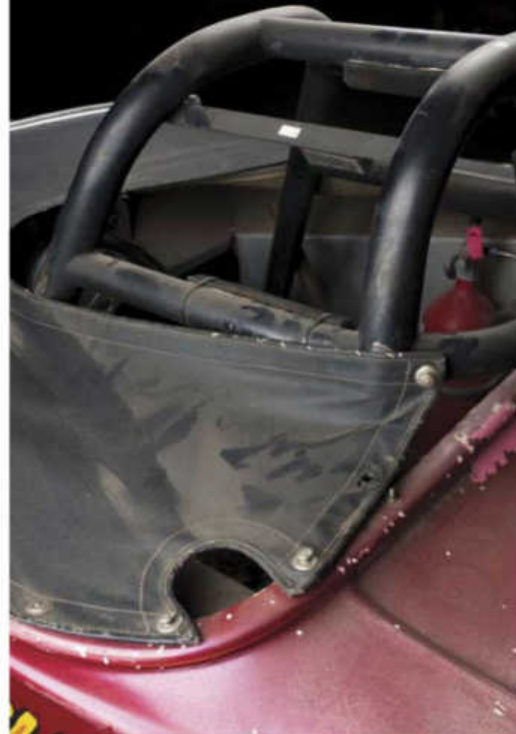
potent small-block with a four-cylinder Pinto engine. Lloyd campaigned the car off and on until selling it to Zeke in 1983.

Zeke set about tearing the car down to the bare frame and replacing the four-cylinder plant with a GMC 302-ci inline six-cylinder engine acquired from Clifford Performance, a leading supplier of inline six-cylinder performance parts. The 302-ci GMC truck engine, originally fitted to 2.5-ton military trucks affectionately known as Deuce-and-a-Halves, had proven a potent hot rod engine in the early-'50s, powering the first car to break 150 mph on the drag strip and setting many land speed records. In stock trim, the engine was good for about 150 hp with solid low-end torque. This rivaled the newly introduced Ford Y-block V-8 and Chevy small-block V-8,



■ Zeke and the roadster accumulated numerous trophies and records throughout the decades.

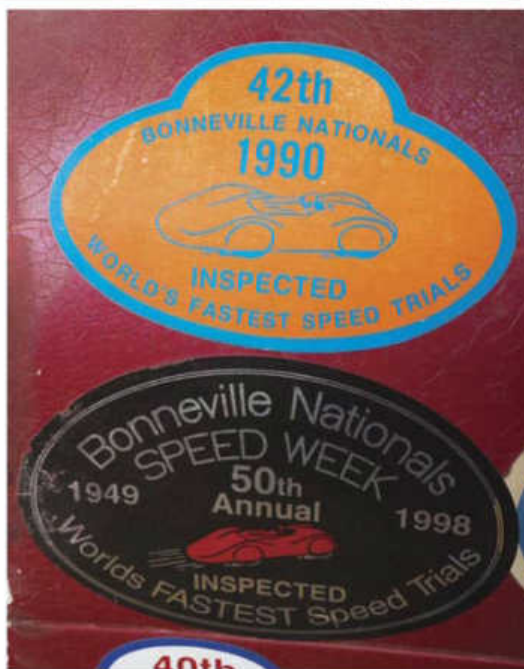




## THE VENERABLE TRUCK ENGINE SPORTED “SIAMESED” EXHAUST AND INTAKE PORTS IN THE HEAD.

although the inline six-cylinders were soon eclipsed once hot rodders realized the potential horsepower lurking in the V-8 motors. While the truck engines were praised for their sturdy blocks and nearly indestructible nature, they belonged to a family of engines that had its roots in the '20s and carried with them a power-robbing head port design.

The venerable truck engine sported “siamesed” exhaust and intake ports in the head. Cylinders 2



■ Inspection stickers are a badge of honor for a Bonneville car, while faded graphics proclaim the car number, owner and class.



and 3 and cylinders 4 and 5 shared a single exhaust port, while cylinders 1 and 6 enjoyed their own. The picture on the intake side was even worse where only three ports were shared between each pair of adjacent cylinders.

Compounding this further, the stock intake manifold design favors the middle intake port, delivering less fuel and air to the front and rear cylinders.

Wayne Horning, a mechanical engineer at Lockheed Aircraft, recognized these shortcomings in the late-'30s and drew up plans for a better-breathing head. While World War II put a hold on his plan to hot rod the Chevy six-cylinder, soon afterwards he produced heads that did away with the antiquated port design.

Other manufacturers took up the cause of the inline engine, notably Howard Johansen of drag and land speed racing fame. He produced cross-flow heads with 12 ports, one port for each intake and exhaust valve, that boasted 1 hp per cubic inch of displacement in street trim.





## EVENT SCHEDULE 2015

**55th annual Circle K NHRA Winternationals**  
Feb. 5-8 · Pomona, Calif.

**31st annual CARQUEST Auto Parts  
NHRA Nationals**  
Feb. 20-22 · Phoenix

**46th annual Amalie Motor Oil  
NHRA Gatornationals**  
March 12-15 · Gainesville

**6th annual NHRA Four-Wide Nationals**  
March 27-29 · Charlotte, N.C.

**16th annual SummitRacing.com NHRA Nationals**  
April 10-12 · Las Vegas

**28th annual O'Reilly Auto Parts  
NHRA Spring Nationals**  
April 24-26 · Houston

**35th annual Summit Racing Equipment NHRA  
Southern Nationals**  
May 15-17 · Atlanta

**27th annual NHRA Kansas Nationals**  
May 22-24 · Topeka, Kan.

**46th annual Toyota NHRA Summernationals**  
June 4-7 · Englishtown

**3rd annual NHRA New England Nationals**  
June 12-14 · Epping, N.H.

**15th annual NHRA Thunder Valley Nationals**  
June 19-21 · Bristol, Tenn.

**9th annual Summit Racing Equipment  
NHRA Nationals**  
July 2-5 · Norwalk, Ohio

**18th annual Route 66 NHRA Nationals**  
July 9-12 · Chicago

**36th annual Mopar Mile-High NHRA Nationals**  
July 24-26 · Denver

**28th annual NHRA Sonoma Nationals**  
July 31-Aug. 2 · Sonoma, Calif.

**28th annual NHRA Northwest Nationals**  
Aug. 7-9 · Seattle

**34th annual Lucas Oil NHRA Nationals**  
Aug. 20-23 · Brainerd, Minn.

**61st annual Chevrolet Performance  
U.S. Nationals**  
Sept. 2-7 · Indianapolis

### NHRA MELLO YELLO DRAG RACING SERIES COUNTDOWN TO THE CHAMPIONSHIP

**8th annual NHRA Carolina Nationals**  
Sept. 18-20 · Charlotte, N.C.

**4th annual AAA Insurance NHRA  
Midwest Nationals**  
Sept. 25-27 · St. Louis

**31st annual NHRA Keystone Nationals**  
Oct. 1-4 · Reading, Pa.

**30th annual AAA Texas NHRA Fall Nationals**  
Oct. 15-18 · Dallas

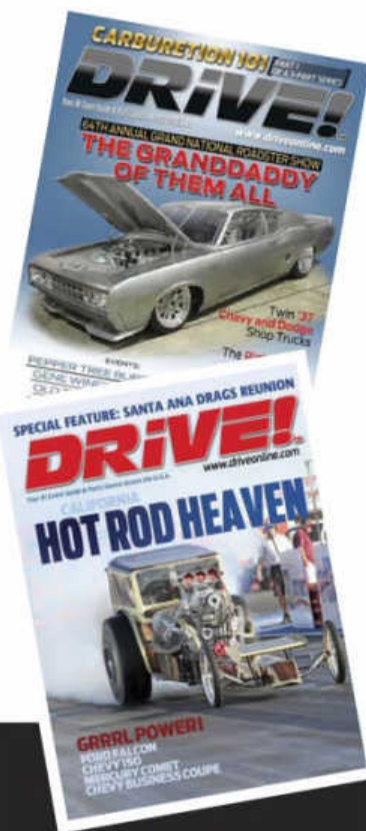
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**Michigan Int'l  
Speedway**  
Brooklyn, MI  
June 20-21

**Road America**  
Elkhart Lake, WI  
August 28-30

**Las Vegas Motor  
Speedway**  
Las Vegas, NV  
April 25-26

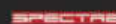
**Charlotte Motor  
Speedway**  
Concord, NC  
July 25-26

**Auto Club  
Speedway**  
Fontana, CA  
October 10-11

**NCM Raceway**  
Bowling Green, KY  
June 6-7

**Pikes Peak Int'l  
Raceway**  
Fountain, CO  
August 8-9

**Optima  
Ultimate Street  
Car Invitational**  
Las Vegas, NV  
November 8-9



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■ Years of storage and time on the salt show in the accumulated patina.



Zeke collected a couple of Howard 12-port heads throughout the years and chose to run them on his 302 GMC motor. He fitted the engine with a Howard 380 cam and 14:1 compression pistons to match. Then he fabricated his own intake and backed up the revived mill with a 1955 Chevy three-speed transmission and Ford 9-inch rearend with .325 gears. He then updated the roll cage to meet new regulations from the SCTA (Southern California Timing Association, one of the governing bodies of land speed racing) and removed nearly 1,100 pounds of lead that had been bolted to the frame in an effort to gain rear wheel traction. The fiberglass body had been stretched 11% in the hood but retained an original grille shell per SCTA rules.

In this configuration, he went to Bonneville and quickly set records. Another rule change split the use of specialty and stock heads into separate classes, and Zeke set records in both in the same day by changing heads. Zeke took the

roadster to run at El Mirage dry lake bed in Southern California and set a record using a stock head on the GMC 6, but the governing body at the race would not certify it since he was not a member of one of the clubs that run the event.

The #29 Zacherson Special even made a couple of appearances on the drag strip. Zeke and the car became a fixture at Bonneville throughout the years, setting records from the mid-'70s until the late-'90s. Pictures of the car have graced four calendars and even the pages of an '80s issue of *Penthouse* magazine.

The retro craze that Zeke helped usher in took a firm grasp of the minds of Bonneville racers. Interest in the roots of land speed racing and hot rodding is stronger now than ever before. Flathead V-8, vintage inline four- and six-cylinder-powered cars now attract more attention than their modern counterparts in the Bonneville staging lanes.

Eventually both Zeke and the roadster started to grow long in the tooth. What once was a vanguard of a retro movement on the salt became just another old race car, so Zeke hung up his helmet. When Joe Fazio, owner of SoCal Speed Shop Sacramento, heard that the #29 Zeke Zacherson Special was available for sale he jumped in to preserve this piece of land speed racing history. It now resides in Joe's collection waiting for its next chance to bring the roots of hot rodding to yet another venue.

**MD**

THE RETRO CRAZE THAT ZEKE HELPED USHER IN TOOK A FIRM GRASP OF THE MINDS OF BONNEVILLE RACERS. **INTEREST IN THE ROOTS OF LAND SPEED RACING AND HOT RODDING IS STRONGER NOW THAN EVER BEFORE.**





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Since race pistons in domestic V-8 engines move up and down in excess of 100 times per second, replacing them is a normal part of a racer's routine. NHRA Top Fuel and Funny Car teams replace them after every race pass and every second qualifying pass. Pro Stock teams replace them after every 40 passes approximately, and weekend warriors replace them every 12 to 18 months, sooner if their engines are nitrous-assisted. At piston replacement time, questions of spec changes usually arise, especially the topic of compression ratios.

Gibtec Piston's Rob Giebas explains, "An engine's compression ratio is calculated by comparing two volumes in the cylinder. One

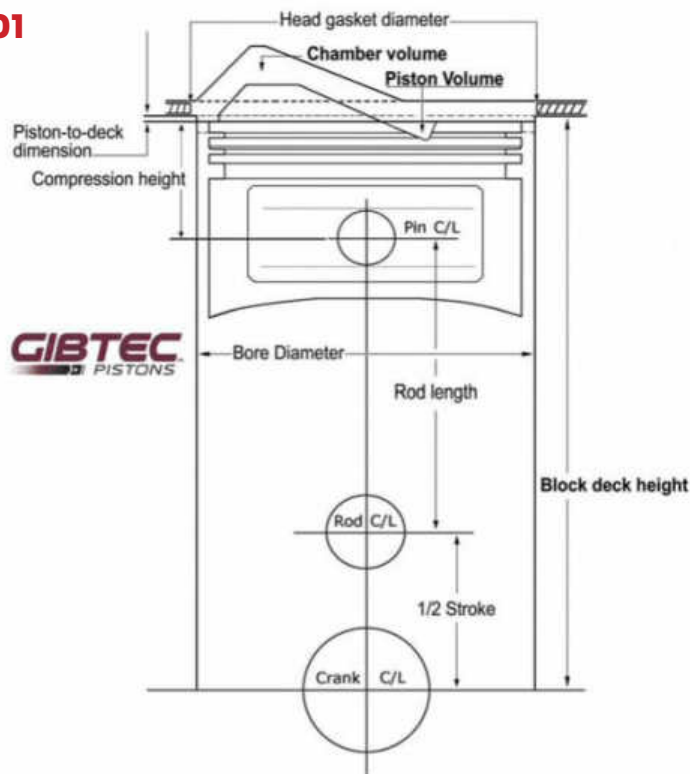
# Putting the SQUEEZE On

## The Importance of Compression Ratios and how to Measure Them

■ BY SAM LOGAN



01



is the swept volume plus the clearance volume. The other is the clearance volume only. The larger the first volume and the smaller the second, the higher the engine's compression ratio"

Swept volume, also called displacement, is the volume a piston displaces in a cylinder as it moves from its lowest point (bottom dead center) to its highest point (top dead center). Displacement does not include the clearance volume, which is the volume above top dead center. By dividing the combined swept and clearance volume by the clearance volume only, the compression ratio can be calculated.

For example, if the swept and clearance volume of a 632-ci, big-block Chevrolet is 1,380.34cc and the clearance volume only is 86.69cc, the compression ratio would be stated as 15.92:1.

To find the engine's displacement in cubic inches the following formula can be applied:  $0.7854 \times \text{bore diameter} \times \text{bore diameter} \times \text{stroke length} \times \text{the number of cylinders}$ . To convert cubic inches to cubic centimeters, multiply by 16.39. Using a burette is the best method for measuring the clearance volume (chamber volume plus piston volume above top dead center).

Compression ratios are often influenced by competition rule books. Also, engine efficiency is a deciding element in their composition. Higher

■ [ABOVE] The inability to measure the block height and the piston and chamber volumes are the two main impediments to achieving accurate compression ratios. The most accurate method for measuring piston and chamber volumes is to fill the spaces with a colored liquid administered through a calibrated burette.

compression ratios aren't always those best calculated to succeed. When you over-compress the cylinder, you induce a pumping loss since it takes horsepower to squeeze the cylinder's contents.

In addition, overly advanced ignition timing isn't always recommended either. As Chuck Lawrence of Jon Kaase Racing Engines contends, "Earlier firing of the ignition causes the engine to work harder, as the piston is rising on its compression stroke it has to overcome the premature downward forces of the expanding gases."

Calculating compression ratios accurately is important for at least three reasons. "First," says Giebas, "pistons are often requested with compression

04



■ Fill a 100ml burette graduated in cc's with a colored liquid to the zero mark (some builders use mineral spirits, others rubbing alcohol with a green tint). Then transfer the liquid to the piston cavity.

02



■ To measure piston volume, first use a degree wheel to attain two objectives: set the piston (complete with rings and attached to the crankshaft with your longest rod) at top dead center and square the piston with the deck.

03



■ Apply a thin line of grease to seal the top edge of the piston to the cylinder and place a thick acrylic plate over the cylinder. The plate requires a 1/4-inch or 3/8-inch-diameter hole drilled where the cylinder meets the piston.

ratios higher than are physically possible to provide. Second, some sanctioning bodies stipulate strict limitations on compression ratios, and if they are not calculated precisely, the racer could either squander power or unwittingly get caught cheating. Third, if the race engine is designed to meet strict specifications, including operating on a specific race fuel, having the compression ratio calculated properly is worth doing."

Yet crucial data is often omitted from custom piston information forms. The two most common difficulties are block deck height and chamber volume. Chamber volume is measured by inverting the cylinder head on the workbench (complete with two valves and a spark plug installed), placing a piece of thick acrylic plastic (with a 1/4-inch or 3/8-inch-diameter hole in it) over the



05



■ It's time to crunch the numbers. The burette delivered 16.8cc. Next, we measure the volume of the combustion chamber.

combustion chamber, filling a 100mm burette graduated in cc's with a colored liquid and transferring the liquid to the combustion chamber. This measuring process is duplicated to establish the piston volume.

Block deck height is measured from the crankshaft centerline to the block deck, usually with some form of caliper. Knowing the exact block deck height is crucial because it is used to verify four vital measurements: half of the stroke dimension, rod length, compression height and the piston-to-deck dimension.

The piston-to-deck dimension is the measurement from the flat area around the piston perimeter to the deck surface. A decision must be made whether to place the piston at zero (flush with the block deck surface) or place it down the bore by a small amount. Most engine builders request the piston-to-deck dimension to be .005 inch or .010 inch down the bore. This small fudge factor gives them the ability to take a skim cut off the decks at a later date if needed.

The compression height of the piston, also known as compression distance, is measured from the centerline of the piston pin to the flat area on the top of the piston. Once these dimensions are established accurately, the piston will be positioned at the precise height in the cylinder, and the compression ratio will be exactly as desired.

However, when some of these vital dimensions are omitted—perhaps the spaces are left blank or they contain the word “stock”—grief usually follows.

Let's assume the racer has a desired

06



■ The first step in preparing to measure combustion chamber volume is to seal it by applying a layer of grease to the mating surfaces of the inlet and exhaust valves.

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07



■ Install the spark plug next.

08



■ Before placing the acrylic top plate over the combustion chamber, a thin line of grease is applied. Take care not to apply too much, or it will enter the chamber to the detriment of the measurement.



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compression ratio of 11.9:1 and believes the block deck height to be stock. Let's further assume 10.720 inches represents stock. But at sometime in the past, and unknown to the present owner, the block visited a machine shop where the decks were "cleaned up" and the height is, in fact, 10.700 inches and not 10.720 inches. As a result, the .020-inch difference in compression distance will cause the piston to sit higher in the bore, resulting in a much higher and unwanted compression ratio of around 12.5:1.

Savvy piston makers with experience in different race engine categories will tell you that compression is a most intriguing topic, and that having more is not always to your advantage. "When better cylinder head and induction manifold designs prevail," says Giebas, "less compression is needed because they accomplish better cylinder filling. Therefore, it compresses more air in a given area, but if the cylinder head and the induction system are less efficient, more compression is needed because there is less air in the cylinder."

**MD**

## SOURCES

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333 West 48<sup>th</sup> Street  
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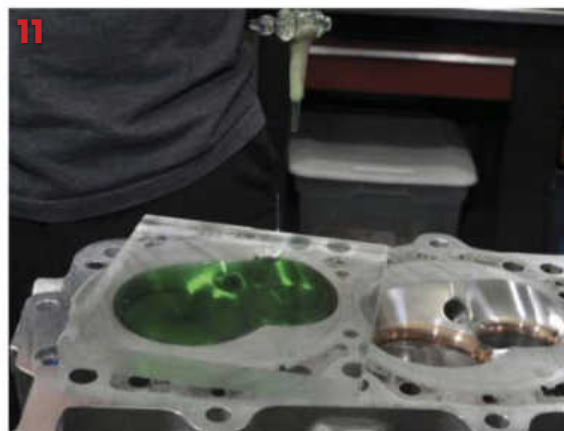
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■ Press the plate down onto the grease, and fill the burette with the liquid until it reaches the zero mark.



■ Dispense the colored liquid from the burette into the chamber. If an air bubble occurs, tilt the cylinder head to bleed the air through the fill hole.



■ This is the condition for which we're aiming.



■ On reading the burette, we learned our combustion chamber volume is 51.7cc. This value plus 1cc to account for the volume around the top ring and the piston volume (in our case 16.8 plus) are the figures the piston supplier needs.



■ Block deck height is the measurement from the crankshaft centerline to the block deck. Usually this measurement is captured by some form of dial gauge caliper. Here, Chuck Lawrence of Jon Kaase Racing Engines uses a steel ball as an aid to obtain an accurate reading.



■ Then he deducts the diameter of the ball and adds half the crank main's journal diameter. On a Kaase Boss Nine engine, the diameter of the main's journal is 3.193 inches; therefore, to establish his block deck height, he takes his dial gauge measurement, subtracts the steel ball measurement and adds 1.5965 inches.



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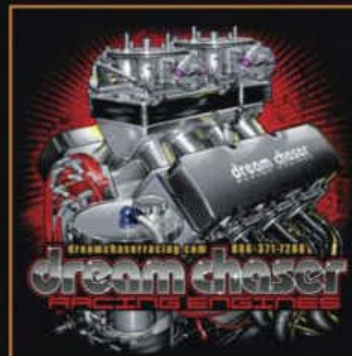
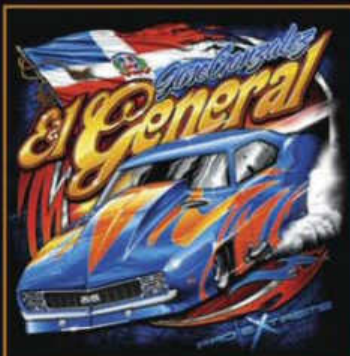
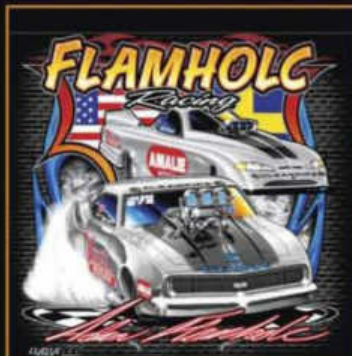
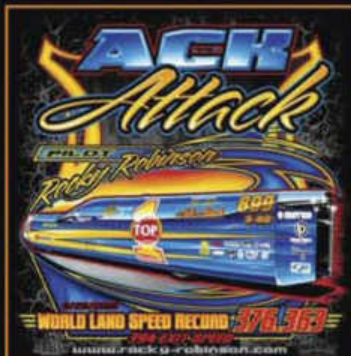
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# A *Life* at Full Throttle

## The Racing Adventures of Raymond Beadle

TEXT BY ALAN PARADISE

■ PHOTOS BY BOB MCCLURG

If you could put together the positive attributes of the most successful Funny Car drivers in NHRA history—the intuitive nature of Jack Chrisman, the toughness of Don Prudhomme, the marketing genius of Tom McEwen, the showmanship of Tommy Ivo, the popularity of Jim Liberman and the media savvy of John Force—you'd create a man named Raymond Beadle.

Beadle's career, although seemingly condensed into a few decades of racing, was an intense span that netted him more than 30 national titles, a legion of fans and the respect of every driver, team owner, track manager, sponsor and journalist.

The path from the tiny Texas town of Spur to the very pinnacle of the motorsports world, on the surface, seems common for the era. However, the manner in which Beadle attacked every aspect of racing was nothing short of amazing.

During the formative days of drag racing, Beadle's small town surroundings were less than ideal for the love of speed. It's tough to race traffic light to traffic light in a town that doesn't even have a traffic light. Nearby Dickens wasn't much better, but head west to Lubbock and now you had something. The land of Buddy Holly offered more than a legacy of rock 'n' roll, it supplied a foray into horsepower.

It has always been said that automotive trends begun in California, are quickly adapted and

■ Raymond's first big-time ride was for "Big Mike" Burkhart.







flavored in Florida, and then migrate to the rest of the country. The lone exception to that formula has always been Texas. Texas has always marched to its own tune. That held true to racing and the colorful cast of characters it has produced. None coming from the Lone Star State was

as charismatic as Raymond Beadle. He used this natural ability to great advantage and quickly climbed the drag racing ladder.

With a quick wit, infectious laugh and movie star smile, Beadle charmed his way onto the A-list. His unique, natural driving ability and aptitude to

understand the subtle technical nuances of the sport earned him the opportunities to jump from doorslammers to Top Fuel dragsters in a very short period of time. His regional success continued to mount, as did his popularity. However, as the '60s were coming to an end, so was Top Fuel as the sport's top draw. Funny Cars had become the fan favorite, and when McEwen and Prudhomme scored the history-changing Mattel Hot Wheels deal, Beadle had

■ With more than 30 titles to his name, Raymond Beadle is among the greatest winners in the history of the sport.





no intention of being left in the flip-top wake.

In 1971, Beadle landed a ride in the Stud Mustang, a former Gas Rhonda Funny Car. He cut his teeth in the older chassis until his efforts led to a seat in fellow Texan “Big Mike” Burkhardt’s Vega-bodied Funny in ’72. That didn’t last long as Don Schumacher scooped up the fast Texan to pilot one of his Stardust Vegas, and later, the Continental Baking Company’s Wonder (Bread) Wagons. This provided Beadle the means to tour with one of the premier drag racing teams of the day. The lessons learned and contacts made would be of great benefit to the likable Texan. The most notable and ultimately important association was Harry Schmidt.

During the formative years of Funny Cars, fellow Texan Harry Schmidt was a talented tuner. He proved his worth as the wrench for the Friendly Chevrolet Nova and Camaro driven by Mike Burkhardt. After a short break from the

**DURING THE FORMATIVE YEARS OF FUNNY CARS, FELLOW TEXAN HARRY SCHMIDT WAS A TALENTED TUNER. HE PROVED HIS WORTH AS THE WRENCH FOR THE FRIENDLY CHEVROLET NOVA AND CAMARO DRIVEN BY MIKE BURKHART.**

sport, Schmidt fielded his own ’69 Mustang Funny with power supplied by Ramchargers Racing Engines. It was about this time that the movie “The Blue Max,” starring George Peppard, was a box office hit. Schmidt loved the idea of the character as well as the Blue Max logo. Coupled with his German heritage and the trend of every Funny Car driver grabbing a nickname, he came up with the idea of

naming his team after the film. After blowing through a number of potential drivers, Richard Tharp won the full-time job. The Blue Max then joined many of the sport’s other Funny Car teams on extended match race and national event tours.

After three seasons on the road, most as long as 40 weeks per year, Schmidt was beat up and longed for his Dallas homeland. He parked the Blue Max at the end of 1972. In the summer of 1974, Schmidt grew restless and Schumacher persuaded him to come on board his team. With Schmidt and Beadle both having Lone Star roots, the two became close friends.

It was during the summer of 1974 that Beadle approached Schmidt with the idea of bringing back the Blue Max Funny Car name. By this time Beadle had wisely developed an extensive Rolodex of factory reps, track managers, sponsors, media contacts and equipment suppliers. After the NHRA U.S. Nationals, Beadle and Schmidt formed their own enterprise. A few months later, Beadle was piloting a new Beadle and Schmidt Blue Max Mustang II.

■ He soon partnered with Harry Schmidt, the original owner of the Blue Max.

■ Don Schumacher recognized Beadle’s abilities and hired him away from Burkhardt. His stint with Schumacher included a ride in one the Wonder Bread Wonder Wagons.





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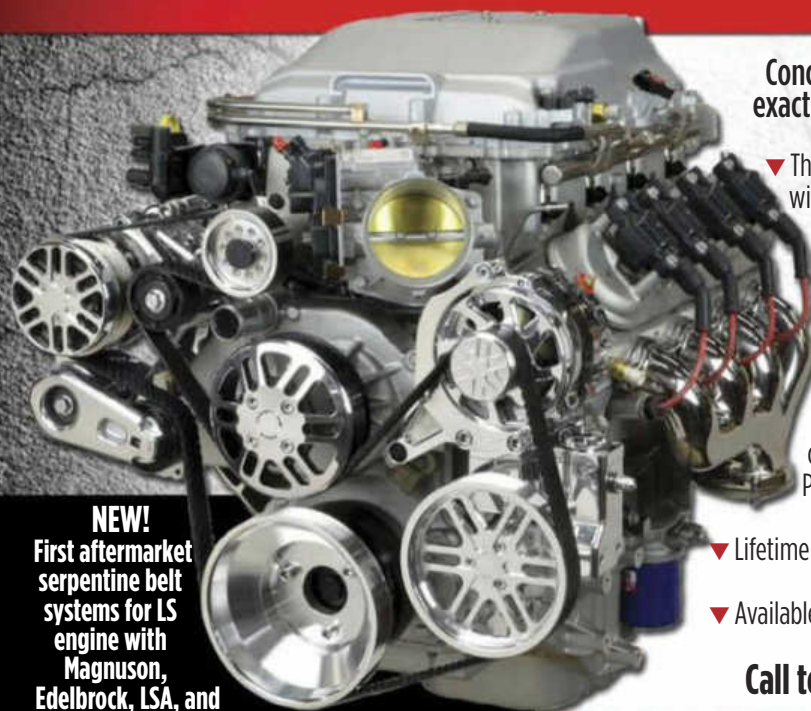


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### HIS SECOND VENTURE SHOCKED THE RACING WORLD. IN 1983, BEADLE WENT STOCK CAR RACING, NOT AS A DRIVER, BUT AS A TEAM OWNER.

With the romantic image of the Blue Max, the tuning talent of Schmidt, and the charismatic personality of Beadle, the Blue Max team became one of the most popular on the circuit. As important to the success of the team as Beadle's driving ability was his track presence. His relationship with the fans was as good as it gets, a lesson he learned by watching Tom "The Mongo\$e" McEwen, who was the undisputed master of the sport. Beadle never just signed autographs; he always took time to speak to each fan, even if it was only a few words. This endeared him to fans and, in turn, connected those fans with the Blue Max and all of its sponsors.

Beadle and Schmidt had a very successful 1974 season, which included beating the nearly unstoppable Prudhomme piloting his Army Monza to win the U.S. Nationals. Following that season, Schmidt, physically and mentally



exhausted from the racing grind, informed Beadle he was retiring, leaving him with the option to buy the Blue Max team. High from his biggest win, Beadle extended himself financially and purchased Schmidt's half of the operation. From that point on, it was all on Beadle, and although he had never

run his own operation, he soon created what would be the blueprint for drag racing success. The blend of good-natured westerner and charming racer could instantly be transformed into that of a dead serious businessman. He was savvy in the boardroom and knew how to market the Blue Max into a formidable brand.

From 1974 to 1978, no driver in the sport was as dominant on the track as Prudhomme. He was about as unbeatable as drag racing had ever seen. But, in terms of branding, Beadle had taken the marketing ideals pioneered by McEwen and Prudhomme to a new level. He understood that branding was the key element to consistent sponsorships. As the Prudhomme garnered all of the titles, Beadle was inching closer on the track but jumping ahead in merchandising. While many

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### THE HORSE RANCH HE BUILT TO ENJOY DURING RACING'S SHORT OFF-SEASON WAS CALLING. HE RETIRED TO WEST TEXAS TO FOCUS ON HIS MANY BUSINESS INTERESTS.

drivers had their cars in die-cast and model kit form (including the Blue Max), Beadle started merchandising items at the track. Shirts, hats, models, decals, posters and cups were available to fans onsite, a practice that's common now but had its roots with Beadle.

In 1979, Beadle's killer instinct on the track kicked into overdrive. For the next three years, tuned by the inimitable Dale Emory and crewed by "Waterbed Fred" Miller and D Gantt, he was the number one driver, winning the NHRA Funny Car championship for three straight years. He also dominated the IHRA circuit, nabbing championships in 1975, 1976 and 1981.

With a head for business and a thirst for success, Beadle ventured into two new directions. He started Chaparral Trailers, units specifically designed to accommodate the unique needs of race teams. The name became synonymous with the sport as the trailer of choice for serious racers.

His second venture shocked the racing world. In 1983, Beadle went stock car racing, not as a driver, but as a team owner. He tapped



■ Beadle and his fabled team (L to R): crew chief Dale Emory, "Waterbed" Fred Miller, D Gantt and Raymond. Far right individuals unidentified.



■ Beadle expanded into NASCAR and also World of Outlaws. Multi-year world champ Sammy Swindell drove the WOO entry.

Tim Richmond to be the first of three drivers for Blue Max Racing. Richmond finished the season in the Top 10 including a win in Pocono. When Richmond left for Hendrick Motorsports in 1986, Beadle took a chance on a young gun named Rusty Wallace. The payoff came in 1989 when Beadle and Wallace took the Blue Max Racing team to the pinnacle of the sport and the Winston Cup crown.

Just because there was a Blue Max on the big ovals it didn't mean that Beadle put drag racing on the back burner. It did, however, split his attention, which resulted in only one national win (Springnationals) in 1983 and two titles in 1984 at Englishtown and Denver. He brought on veteran "Lil'" John Lombardo to drive in 1985 and 1986, and he took one final round at the wheel in 1987.

In an odd twist of irony, as Beadle and Wallace were in the heat of a NASCAR season, the Blue Max Funny Car, the roots of Raymond's racing fame and where he had the most success, made its final pass driven by Ronny Young.

Loyalty in racing can often be an oxymoron. When Wallace abandoned Beadle for Penske Racing in 1991, Blue Max Racing not only lost its driver, but the sponsorship with Miller Beer went with the driver. Beadle was more than angry; he became disillusioned with NASCAR racing. He created a World of Outlaw team, piloted by sprint car legend Sammy Swindell, but soon closed that after a few seasons.

By 1995, the good old days of drag racing were gone as well. The sport had transformed from a touring affair to a points chase. Gone were the days of match races and having fun

while you run. There was less and less camaraderie and experimentation. It was semis, hospitality tents and sponsorship courting. The days of wrenching had become filled with formulas and computer technology. It had become an eerie reminder of the taste of NASCAR. Beadle knew he could adapt and thrive in the "new" NHRA, but the desire was not there. He thought about his old friend Harry Schmidt. He now longed for the joys of a simpler, slower life, about his Texas roots in a town with a population of 500. The horse ranch he built to enjoy during racing's short off-season was calling. He retired to West Texas to focus on his many business interests as well as trying his hand at cattle ranching. He found a quieter success outside racing's limelight that became just as satisfying.

The NHRA honored Raymond Beadle as number 20 of the top drivers of all time. He collected 13 NHRA national event titles, made it to 28 final rounds and won three world championships. What he did in the pits was just as impressive: developing a legion of fans with his engaging personality and pioneering approach to merchandising the Blue Max image he so deeply loved.

**MD**



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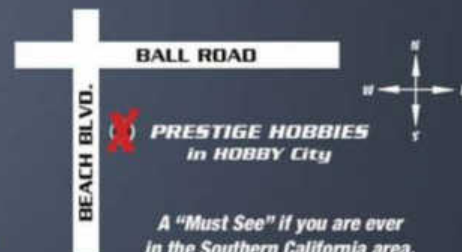
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# The Allure of Speed

■ BY SCOTT FISHER



If you're reading this magazine, it's safe to say that you love speed. You love to bounce off the rev limiter in all forward gears in an empty desert, or mash the gas and pin the passenger to the seatback. Maybe it's a lower E.T. than you've ever recorded, maybe it's a 200 MPH Club badge, but it's the speed that lures us back. What is it about speed that we find so compelling?

For most performance enthusiasts, it's not about the number. Most of us will travel three to five times faster in an airliner than we ever will in an automobile, but we'll never have the same thrill of speed. Sure, it's hard to have fun wedged between a sweaty fat guy and a fidgety, sticky-fingered kid, but it's more than that. There's no frame of reference when you're going 600 mph over the ocean. It's how fast you're going relative to the scenery that matters.

My first experience with going fast came when I was seven or eight. I'd pull my Radio Flyer wagon up to the top of

the hill on our dead-end street and ride it down towards the olive orchard past our house. I loved the sensation of gathering velocity, the roadway whizzing under the hard rubber tires of the wagon as I struggled to steer, the handle folded back against my chest offering little leverage against the pebbled asphalt surface. The faster I went, the closer I came to where the pavement ended in a gravel-and-dirt ramp that led to a little stream. How fast was I going? Didn't matter; what mattered was the breathless exhilaration of motion, the rush of tarmac and parked cars as my wagon

careened down toward the ramp. Most of all, it was the thrill of surviving that uncontrolled rush, of bouncing over the ruts in the gravel and climbing out of the wagon with a shout of joy: that is what I recall most vividly from those days.

Mario Andretti said, "If everything seems under control, you're just not going fast enough." As a kid, I knew exactly what Mario meant. I felt out of control, at probably not much more than 10 miles an hour, but it got me hooked on velocity.

How about you? What's your earliest memory of the thrill of going fast? **MD**



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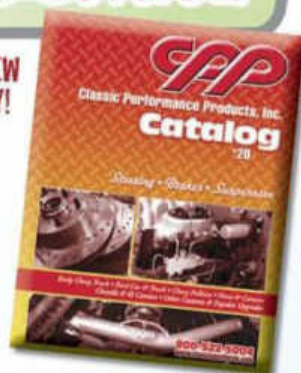
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FOR 1955-64 CHEVY



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1964-72 CHEVELLE, 1968-70 NOVA, & 1967-68 CAMARO

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MUSTANG

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Shown with powdercoated  
calipers  
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DIAMETER DISC  
BRAKE TYPE  
WHEELS



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